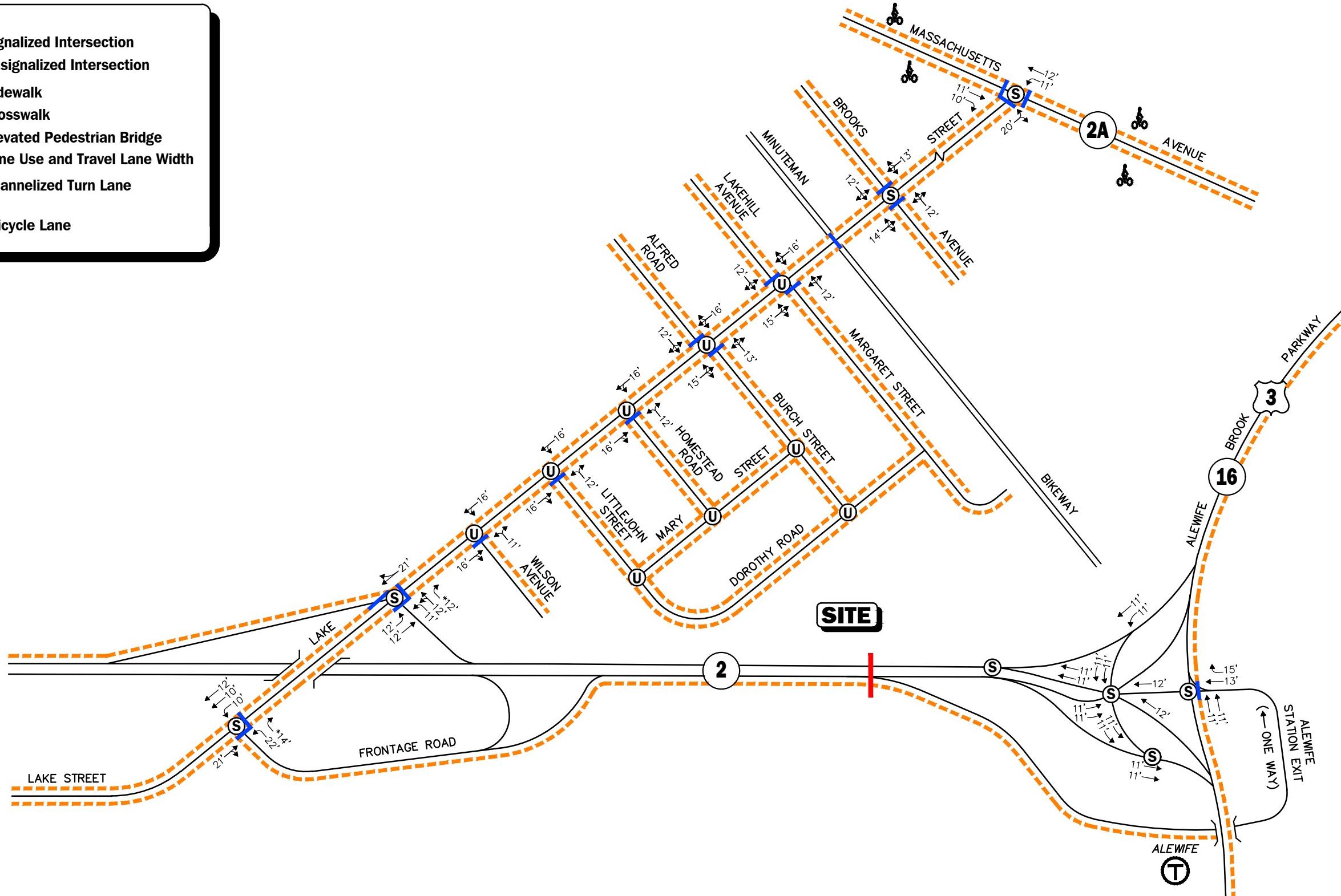
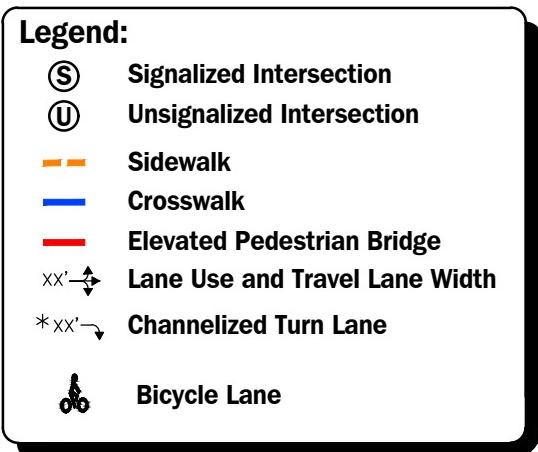


## **APPENDIX**

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REVISED TRAFFIC VOLUME NETWORKS  
LAKE STREET AT BROOKS AVENUE TRAFFIC COUNTS  
PEDESTRIAN/BICYCLE COVID ADJUSTMENT CALCULATIONS  
K-FACTOR CALCULATION  
VEHICLE OCCUPANCY RATE  
MODE SPLIT DATA  
PEDESTRIAN PATH TO ALEWIFE STATION FIGURE  
CAPACITY ANALYSIS

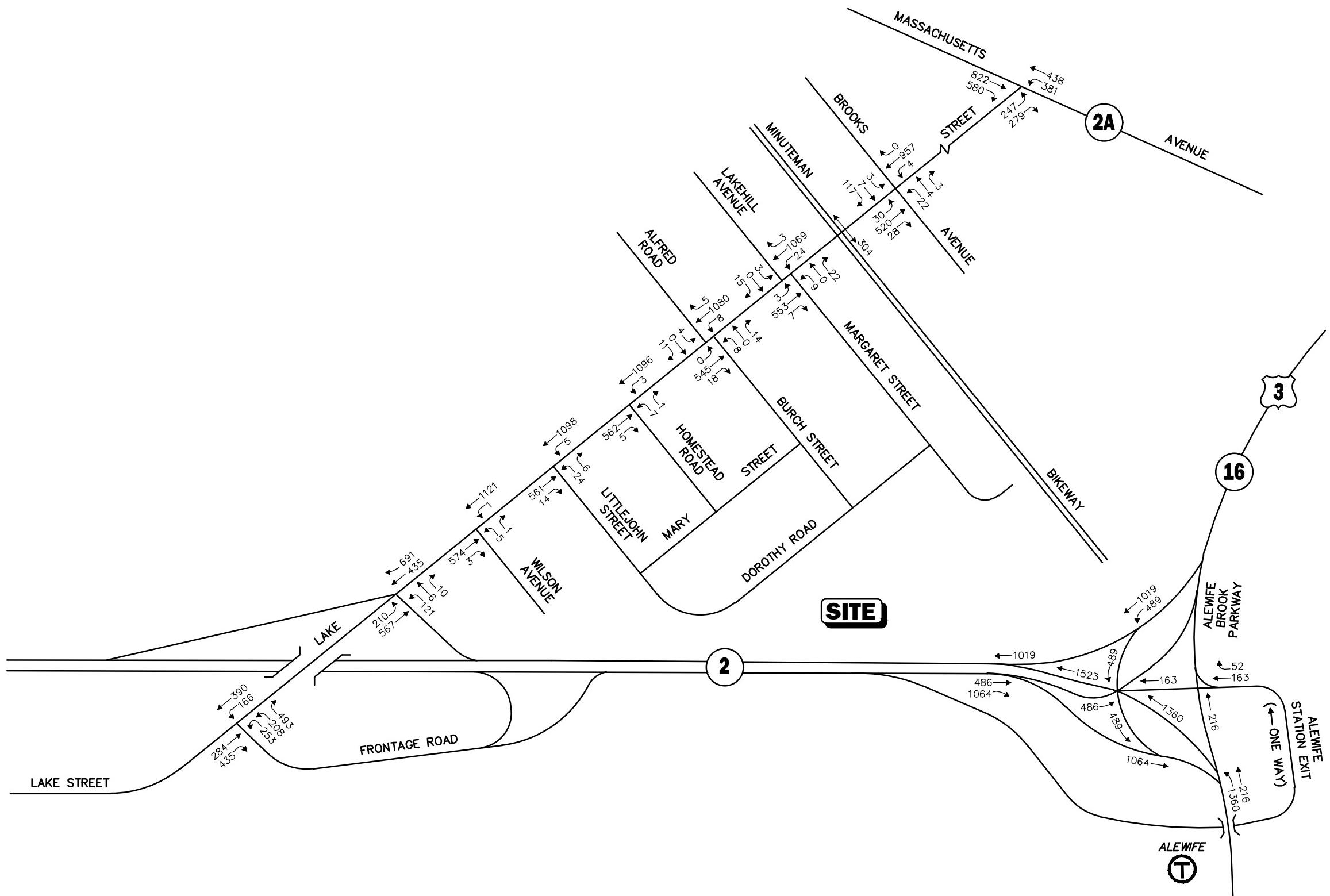
REVISED TRAFFIC VOLUME NETWORKS



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.  
Not To Scale

Figure 2R

Existing Intersection Lane Use,  
Travel Lane Width, and  
Pedestrian Facilities

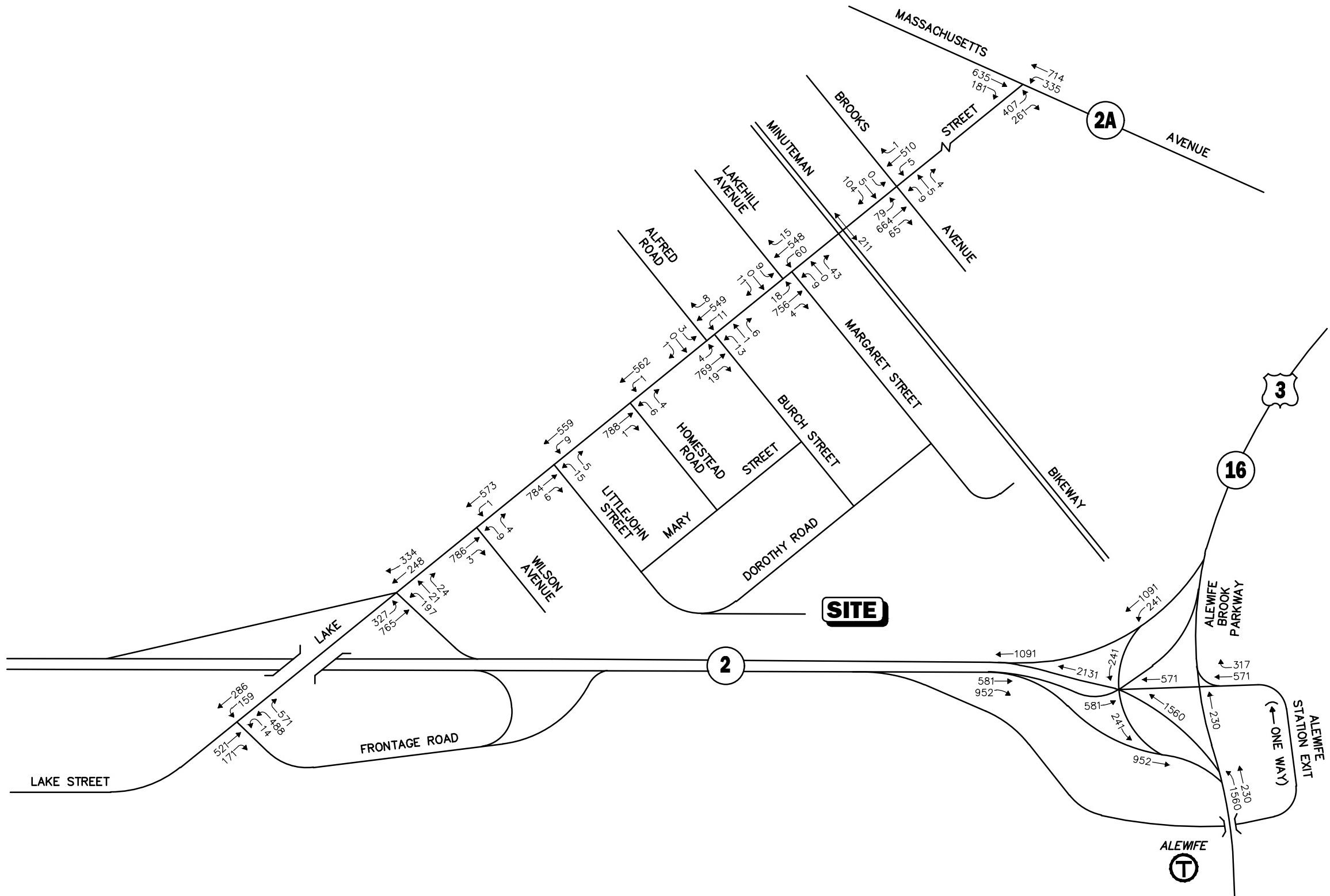


**Note:** Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 3R

## **2020 Baseline Weekday Morning Peak Hour Traffic Volumes**

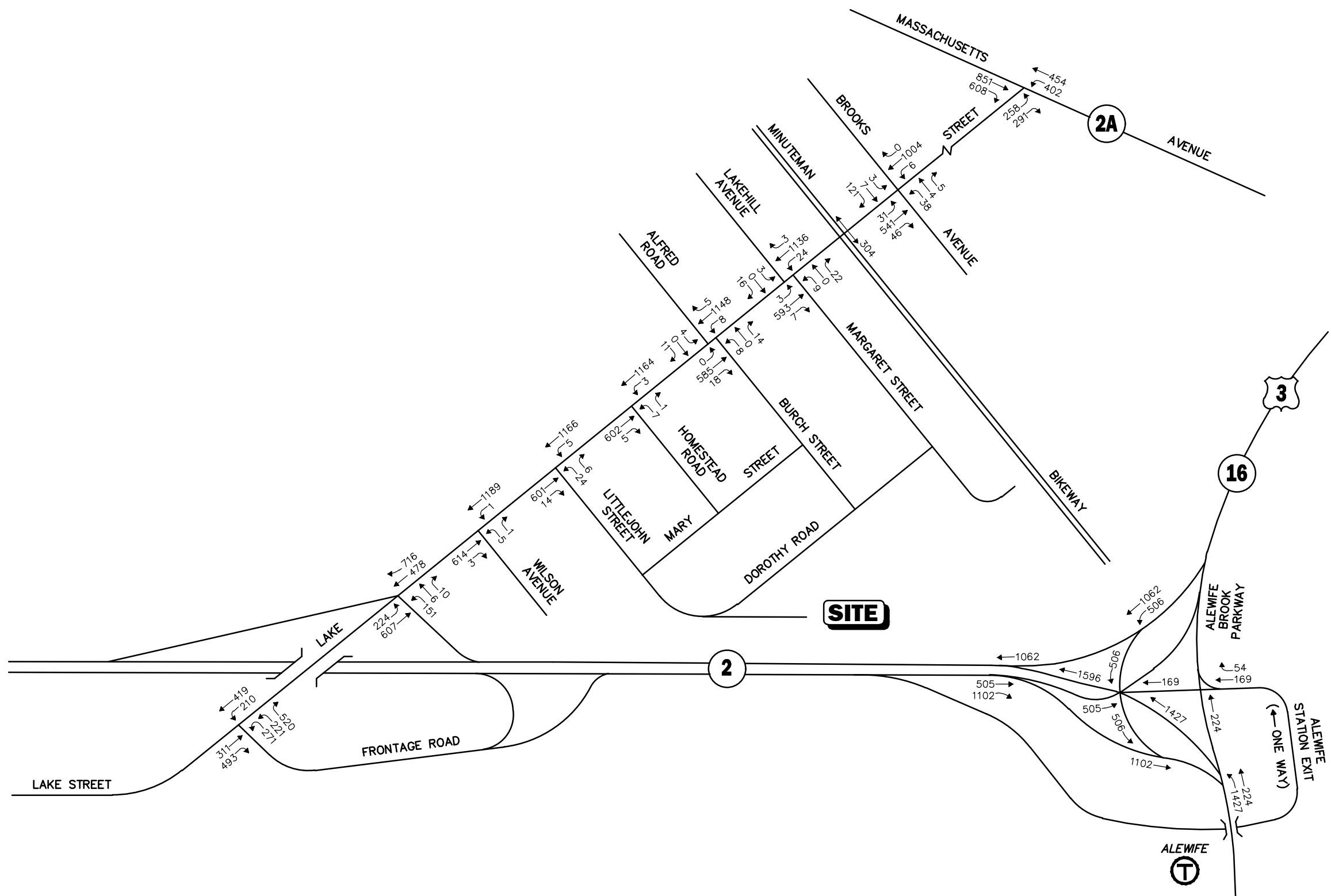


**Note:** Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 4R

## **2020 Baseline Weekday Evening Peak Hour Traffic Volumes**

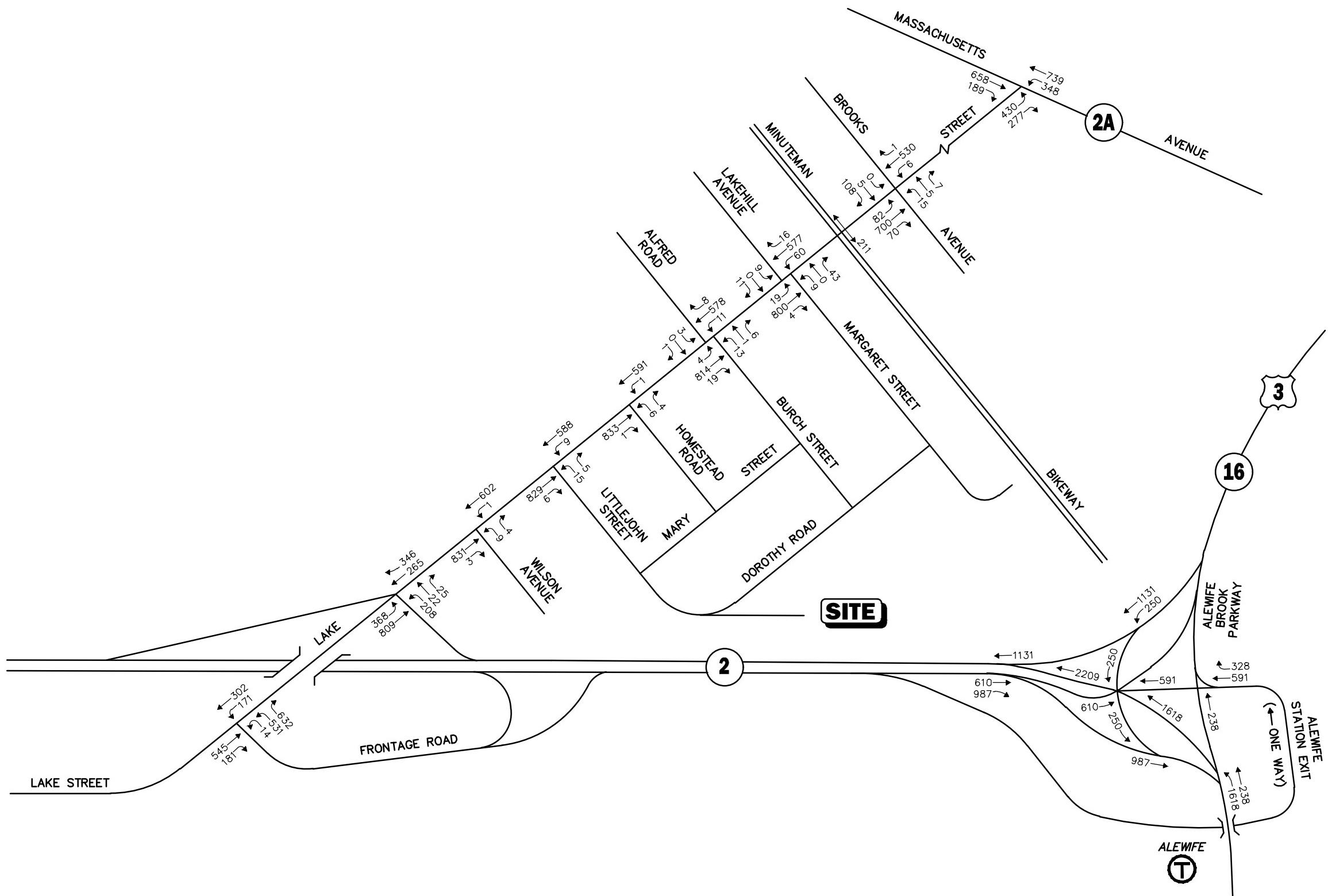


Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 5R

2027 No-Build  
Weekday Morning  
Peak Hour Traffic Volumes



**Note:** Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

**Figure 6R**

# **2027 No-Build Weekday Evening Peak Hour Traffic Volumes**

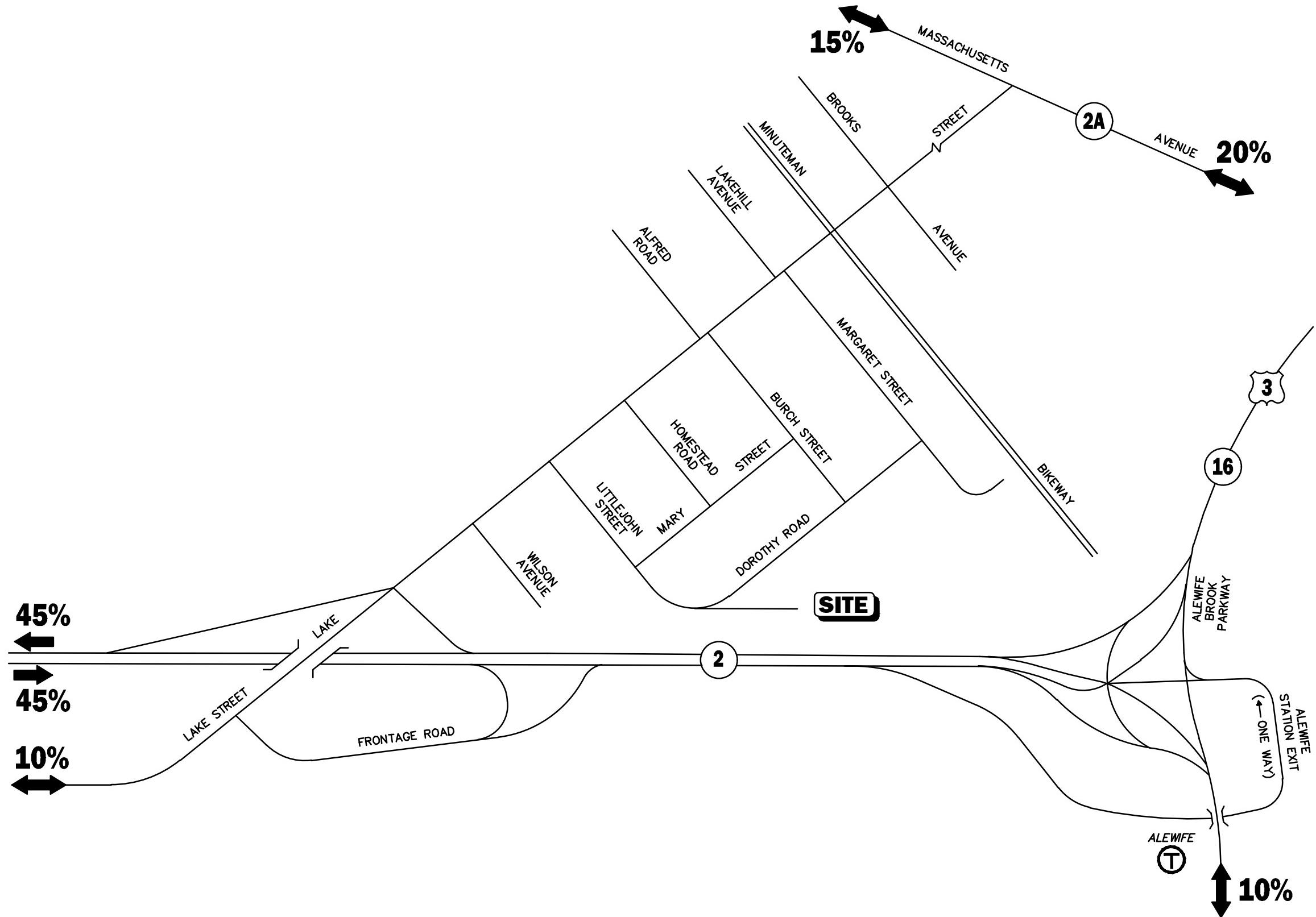
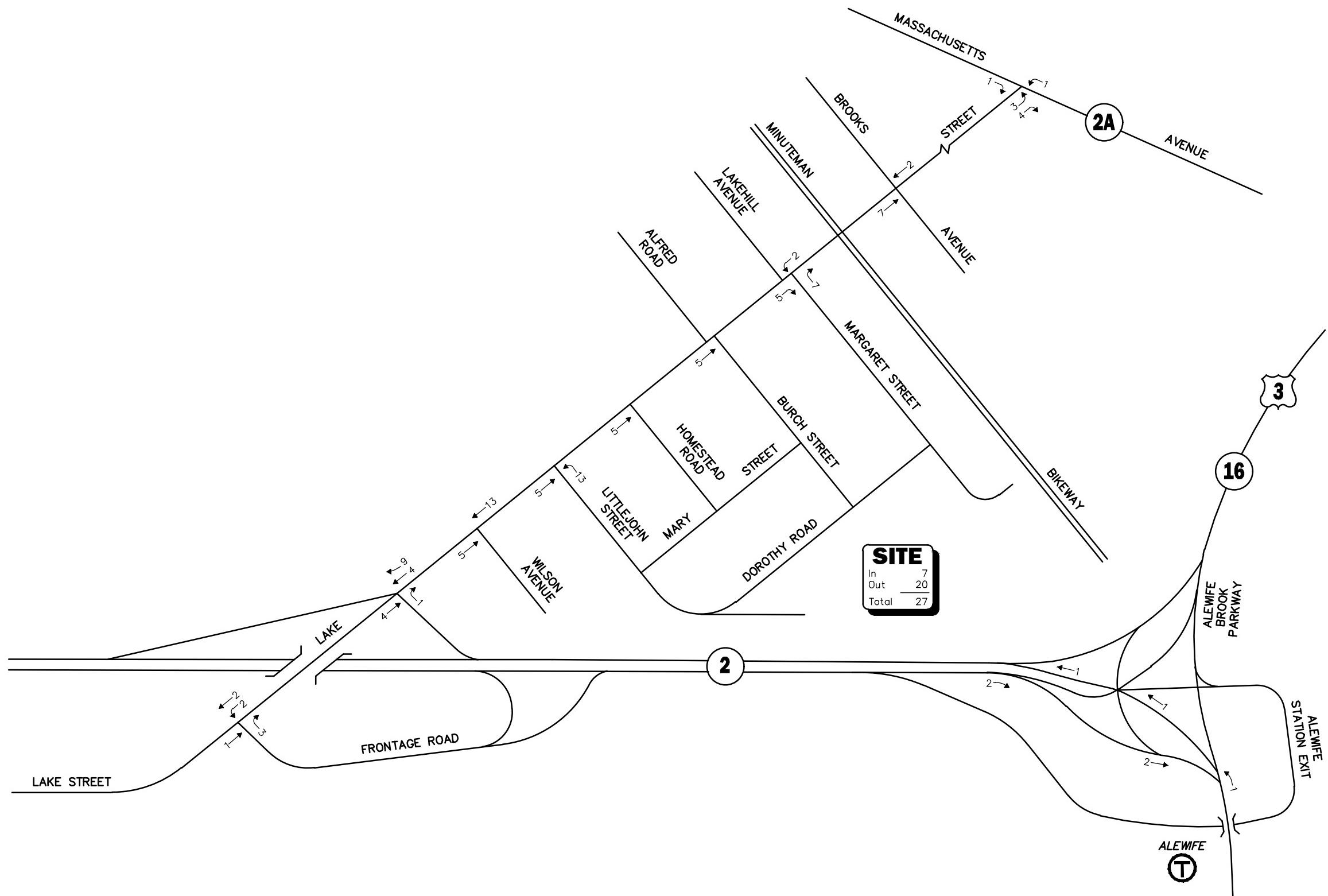


Figure 7R

Trip Distribution Map



Not To Scale

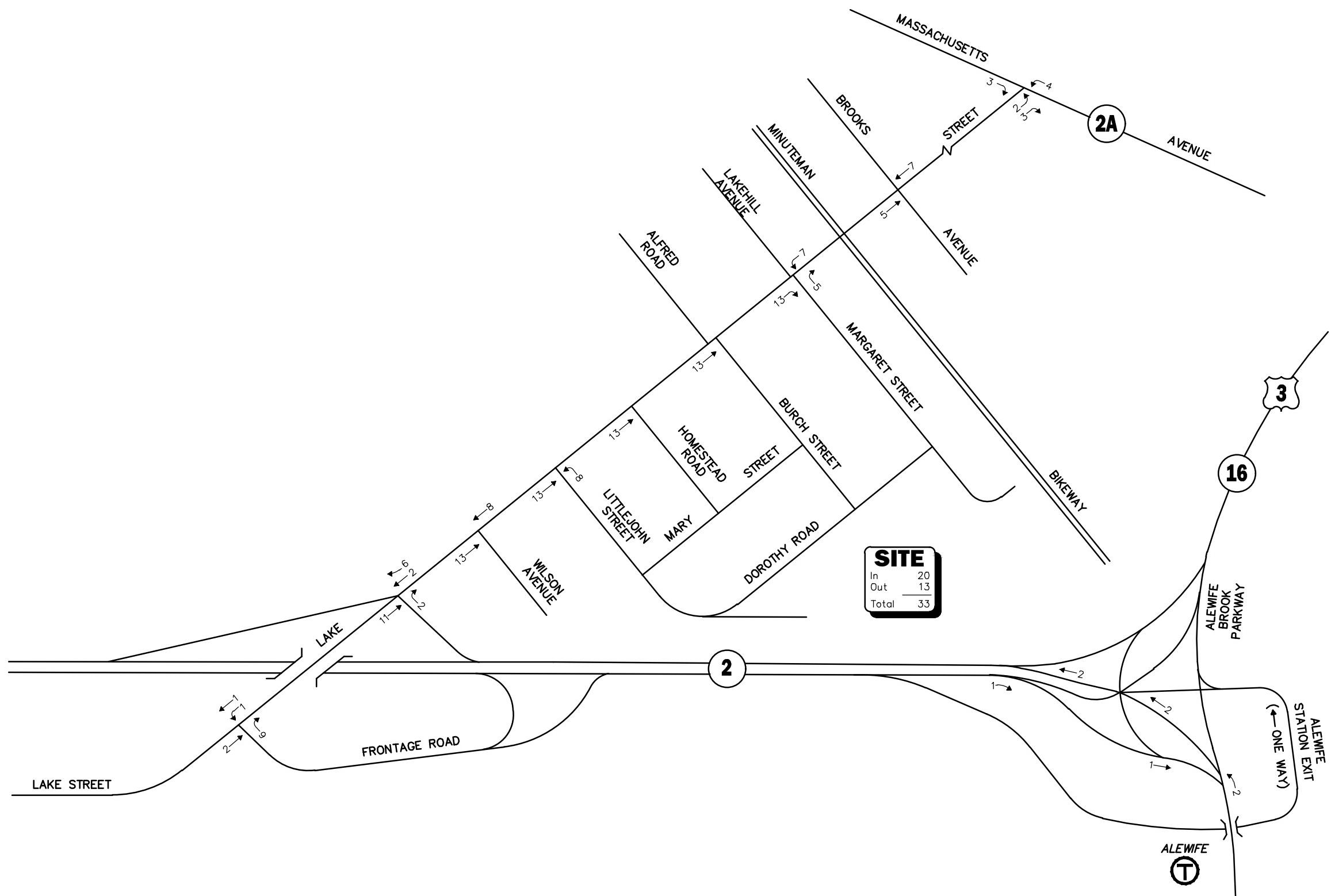


Not To Scale

**VAI** Vanasse & Associates inc

Figure 8R

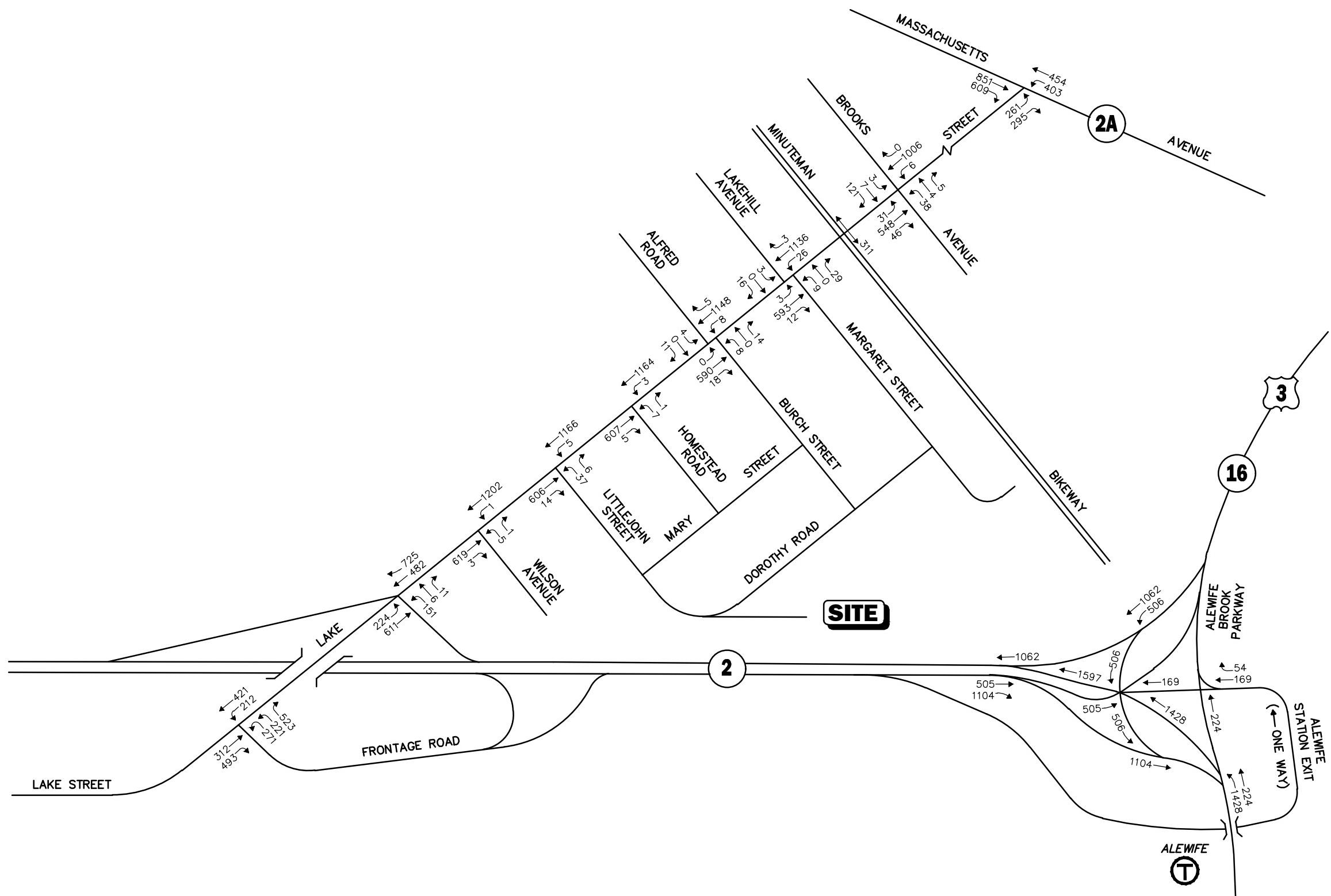
Site Generated  
Weekday Morning  
Peak Hour Traffic Volumes



Not To Scale

Figure 9R

**Site Generated  
Weekday Evening  
Peak Hour Traffic Volumes**

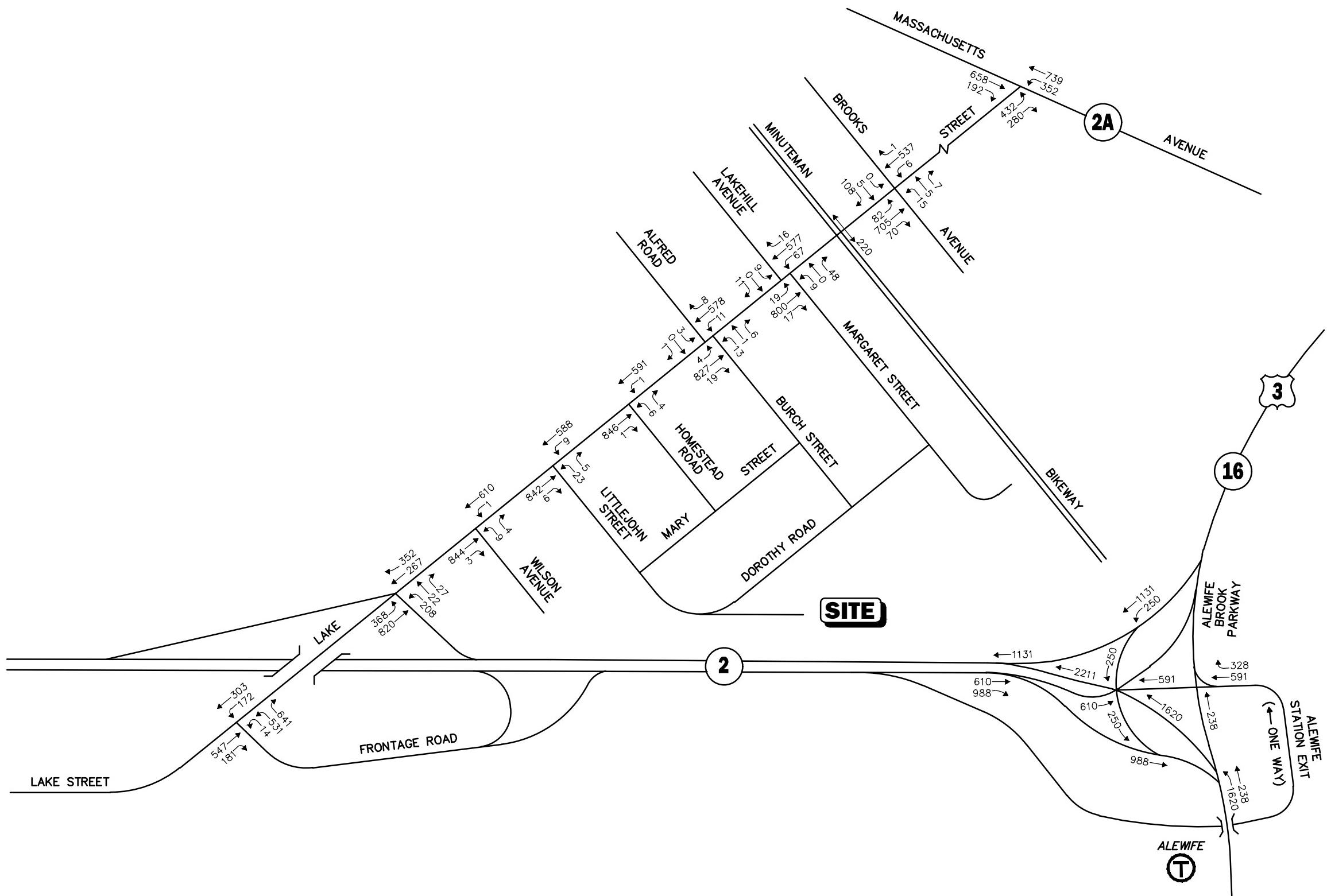


Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 10R

2027 Build  
Weekday Morning  
Peak Hour Traffic Volumes



**Note:** Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 11R

## **2027 Build Weekday Evening Peak Hour Traffic Volumes**

LAKE STREET AT BROOKS AVENUE TRAFFIC COUNTS

**Accurate Counts**  
978-664-2565

N/S Street : Brooks Road  
 E/W Street : Lake Street  
 City/State : Arlington, MA  
 Weather : Cloudy

File Name : 84510005  
 Site Code : 84510005  
 Start Date : 9/10/2020  
 Page No : 1

**Groups Printed- Cars - Trucks**

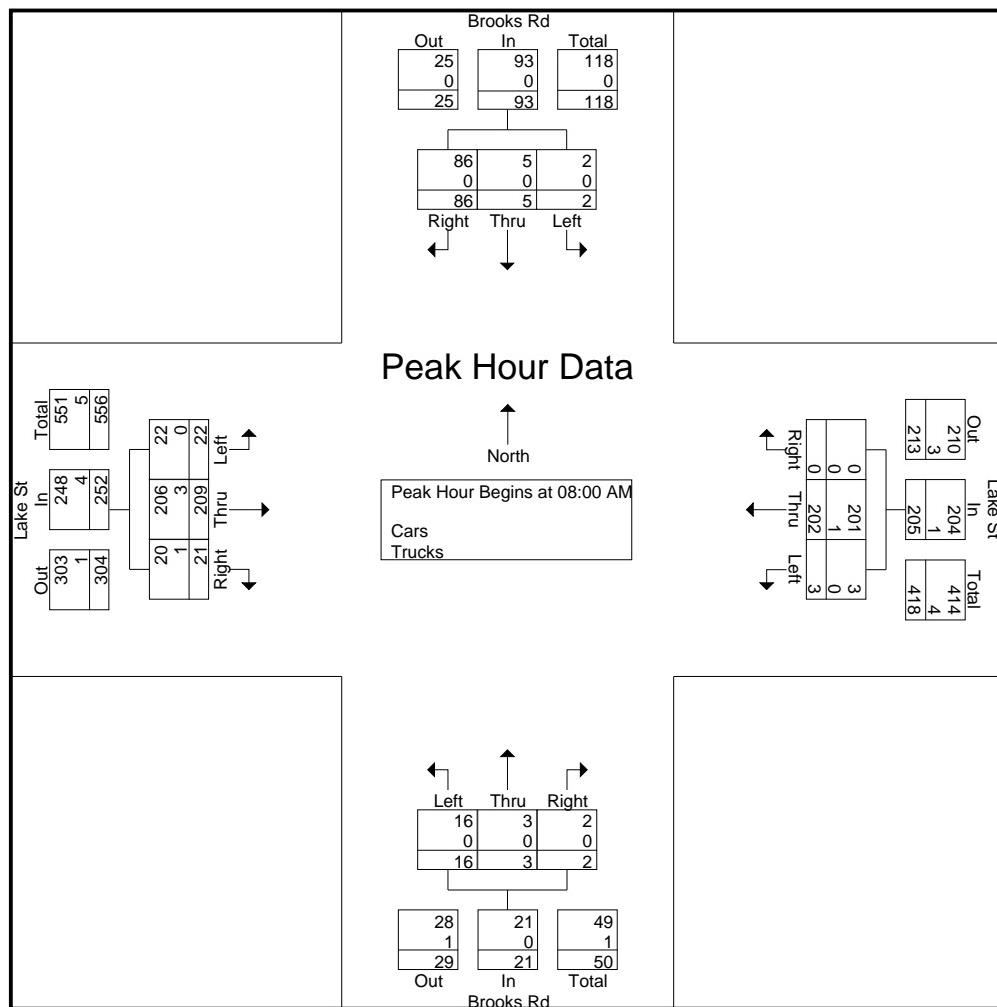
	Brooks Rd From North			Lake St From East			Brooks Rd From South			Lake St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	1	2	13	1	41	1	3	0	1	6	31	7	107
07:15 AM	0	0	15	2	38	0	7	0	0	4	32	6	104
07:30 AM	0	2	21	0	57	0	3	0	0	1	32	12	128
07:45 AM	0	1	16	0	64	0	2	0	0	3	52	3	141
Total	1	5	65	3	200	1	15	0	1	14	147	28	480
08:00 AM	0	2	28	1	44	0	5	0	1	4	41	6	132
08:15 AM	0	1	23	1	47	0	9	3	0	4	58	11	157
08:30 AM	1	2	15	1	52	0	1	0	1	8	55	1	137
08:45 AM	1	0	20	0	59	0	1	0	0	6	55	3	145
Total	2	5	86	3	202	0	16	3	2	22	209	21	571
Grand Total	3	10	151	6	402	1	31	3	3	36	356	49	1051
Apprch %	1.8	6.1	92.1	1.5	98.3	0.2	83.8	8.1	8.1	8.2	80.7	11.1	
Total %	0.3	1	14.4	0.6	38.2	0.1	2.9	0.3	0.3	3.4	33.9	4.7	
Cars	3	10	151	6	400	1	31	3	3	36	350	48	1042
% Cars	100	100	100	100	99.5	100	100	100	100	100	98.3	98	99.1
Trucks	0	0	0	0	2	0	0	0	0	0	6	1	9
% Trucks	0	0	0	0	0.5	0	0	0	0	0	1.7	2	0.9

	Brooks Rd From North				Lake St From East				Brooks Rd From South				Lake St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	2	28	30	1	44	0	45	5	0	1	6	4	41	6	51	132
08:15 AM	0	1	23	24	1	47	0	48	9	3	0	12	4	58	11	73	157
08:30 AM	1	2	15	18	1	52	0	53	1	0	1	2	8	55	1	64	137
08:45 AM	1	0	20	21	0	59	0	59	1	0	0	1	6	55	3	64	145
Total Volume	2	5	86	93	3	202	0	205	16	3	2	21	22	209	21	252	571
% App. Total	2.2	5.4	92.5		1.5	98.5	0		76.2	14.3	9.5		8.7	82.9	8.3		
PHF	.500	.625	.768	.775	.750	.856	.000	.869	.444	.250	.500	.438	.688	.901	.477	.863	.909
Cars	2	5	86	93	3	201	0	204	16	3	2	21	22	206	20	248	566
% Cars	100	100	100	100	100	99.5	0	99.5	100	100	100	100	100	98.6	95.2	98.4	99.1
Trucks	0	0	0	0	0	1	0	1	0	0	0	0	0	3	1	4	5
% Trucks	0	0	0	0	0	0.5	0	0.5	0	0	0	0	0	1.4	4.8	1.6	0.9

**Accurate Counts**  
978-664-2565

N/S Street : Brooks Road  
E/W Street : Lake Street  
City/State : Arlington, MA  
Weather : Cloudy

File Name : 84510005  
Site Code : 84510005  
Start Date : 9/10/2020  
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				08:00 AM			
+0 mins.	0	<b>2</b>	21	23	0	57	0	57	3	0	0	3	4	41	6	51
+15 mins.	0	1	16	17	0	<b>64</b>	0	<b>64</b>	2	0	0	2	4	<b>58</b>	<b>11</b>	<b>73</b>
+30 mins.	0	2	<b>28</b>	<b>30</b>	1	44	0	45	5	0	1	6	<b>8</b>	55	1	64
+45 mins.	0	1	23	24	1	47	0	48	<b>9</b>	<b>3</b>	0	<b>12</b>	6	55	3	64
Total Volume	0	6	88	94	2	212	0	214	19	3	1	23	22	209	21	252
% App. Total	0	6.4	93.6		0.9	99.1	0		82.6	13	4.3		8.7	82.9	8.3	
PHF	.000	.750	.786	.783	.500	.828	.000	.836	.528	.250	.250	.479	.688	.901	.477	.863
Cars	0	6	88	94	2	212	0	214	19	3	1	23	22	206	20	248
% Cars	0	100	100	100	100	100	0	100	100	100	100	100	100	98.6	95.2	98.4
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	4
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	4.8	1.6

**Accurate Counts**  
978-664-2565

N/S Street : Brooks Road  
 E/W Street : Lake Street  
 City/State : Arlington, MA  
 Weather : Cloudy

File Name : 84510005  
 Site Code : 84510005  
 Start Date : 9/10/2020  
 Page No : 7

Groups Printed- Trucks

	Brooks Rd From North			Lake St From East			Brooks Rd From South			Lake St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
07:15 AM	0	0	0	0	1	0	0	0	0	0	1	0	2
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	1	0	0	0	0	0	3	0	4
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	1	1	2
08:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
08:45 AM	0	0	0	0	1	0	0	0	0	0	1	0	2
Total	0	0	0	0	1	0	0	0	0	0	3	1	5
Grand Total	0	0	0	0	2	0	0	0	0	0	6	1	9
Apprch %	0	0	0	0	100	0	0	0	0	0	85.7	14.3	
Total %	0	0	0	0	22.2	0	0	0	0	0	66.7	11.1	

	Brooks Rd From North				Lake St From East				Brooks Rd From South				Lake St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
08:45 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	3	1	4	5
% App. Total	0	0	0		0	100	0		0	0	0		0	75	25		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.750	.250	.500	.625

**Accurate Counts**  
978-664-2565

N/S Street : Brooks Road  
 E/W Street : Lake Street  
 City/State : Arlington, MA  
 Weather : Cloudy

File Name : 84510005  
 Site Code : 84510005  
 Start Date : 9/10/2020  
 Page No : 10

Groups Printed- Bikes Peds

	Brooks Rd From North				Lake St From East				Brooks Rd From South				Lake St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Excl. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	5	0	5
07:15 AM	0	0	1	4	0	1	0	8	0	0	0	0	0	0	0	1	1	3	16
07:30 AM	0	0	1	2	0	1	0	2	0	0	0	0	0	0	2	1	3	7	5
07:45 AM	0	0	1	1	0	2	0	0	0	0	0	3	0	0	0	3	7	3	10
Total	0	0	3	9	0	4	0	11	0	0	0	3	0	2	2	9	32	11	43
08:00 AM	0	0	0	5	0	1	0	0	0	0	0	6	0	1	1	2	13	3	16
08:15 AM	0	0	0	4	0	3	0	2	0	0	0	1	1	0	1	0	7	5	12
08:30 AM	0	0	0	4	0	2	0	1	0	0	0	7	0	0	2	5	17	4	21
08:45 AM	0	0	0	4	0	1	0	2	0	0	2	0	0	1	0	0	6	4	10
Total	0	0	0	17	0	7	0	5	0	0	2	14	1	2	4	7	43	16	59
Grand Total	0	0	3	26	0	11	0	16	0	0	2	17	1	4	6	16	75	27	102
Apprch %	0	0	100		0	100	0		0	0	100		9.1	36.4	54.5				
Total %	0	0	11.1		0	40.7	0		0	0	7.4		3.7	14.8	22.2		73.5	26.5	

	Brooks Rd From North				Lake St From East				Brooks Rd From South				Lake St From West						
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total		
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 07:30 AM																			
07:30 AM	0	0	1	1	0	1	0	1	0	0	0	0	0	0	2	1	3	5	
07:45 AM	0	0	1	1	0	2	0	2	0	0	0	0	0	0	0	0	0	3	
08:00 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	2	3	
08:15 AM	0	0	0	0	0	3	0	3	0	0	0	0	0	1	0	1	2	5	
Total Volume	0	0	2	2	0	7	0	7	0	0	0	0	1	3	3	7	16		
% App. Total	0	0	100		0	100	0		0	0	0		14.3	42.9	42.9				
PHF	.000	.000	.500	.500	.000	.583	.000	.583	.000	.000	.000	.000	.250	.375	.750	.583	.800		

## **Accurate Counts**

N/S Street : Brooks Road  
E/W Street : Lake Street  
City/State : Arlington, MA  
Weather : Cloudy

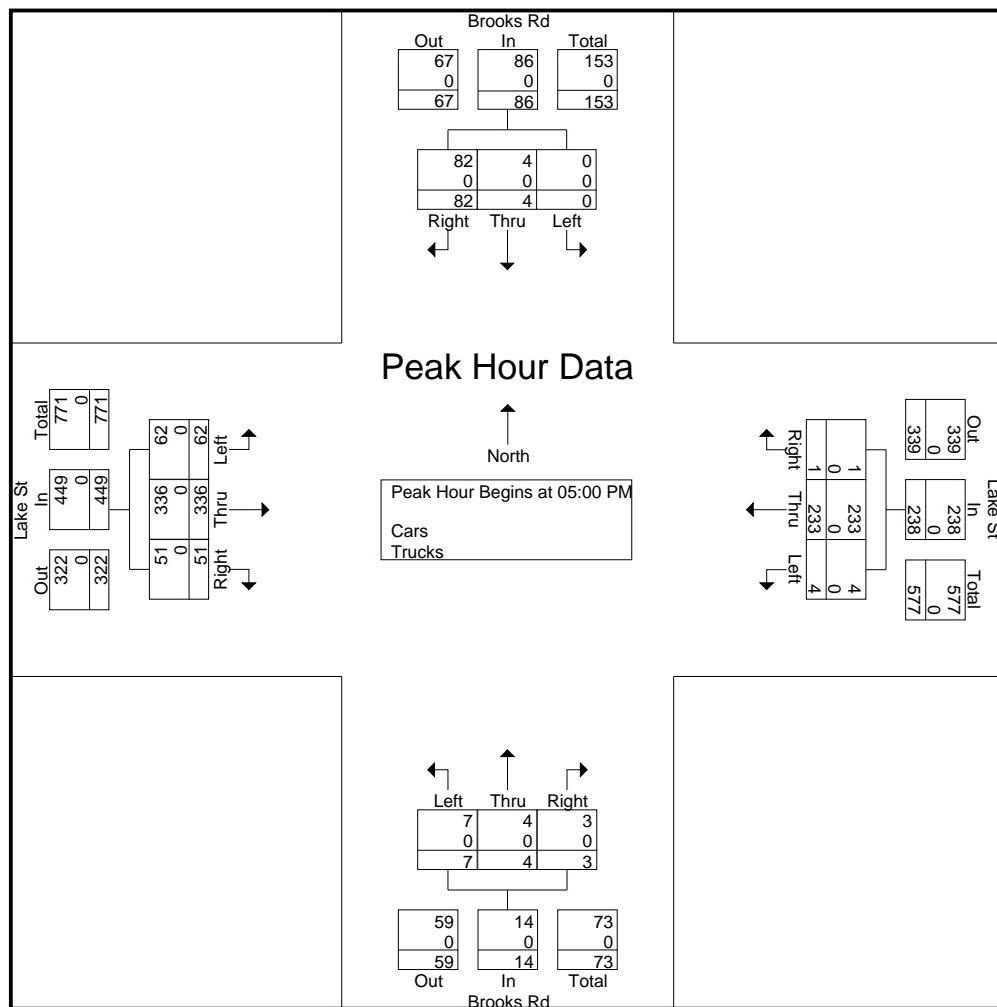
File Name : 84510005  
Site Code : 84510005  
Start Date : 9/10/2020  
Page No : 1

## Groups Printed- Cars - Trucks

## **Accurate Counts**

N/S Street : Brooks Road  
E/W Street : Lake Street  
City/State : Arlington, MA  
Weather : Cloudy

File Name : 84510005  
Site Code : 84510005  
Start Date : 9/10/2020  
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

#### Peak Hour for Each Approach Begins at:

## **Accurate Counts**

N/S Street : Brooks Road  
E/W Street : Lake Street  
City/State : Arlington, MA  
Weather : Cloudy

File Name : 84510005  
Site Code : 84510005  
Start Date : 9/10/2020  
Page No : 7

## Groups Printed- Trucks

**Accurate Counts**  
978-664-2565

N/S Street : Brooks Road  
 E/W Street : Lake Street  
 City/State : Arlington, MA  
 Weather : Cloudy

File Name : 84510005  
 Site Code : 84510005  
 Start Date : 9/10/2020  
 Page No : 10

Groups Printed- Bikes Peds

	Brooks Rd From North				Lake St From East				Brooks Rd From South				Lake St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Excl. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	1	0	0	0	1	1	0	1	2	0	0	0	1	5	2	7
04:15 PM	0	0	1	0	0	0	0	1	0	0	0	3	0	0	0	3	7	1	8
04:30 PM	0	0	0	1	0	0	0	2	0	0	0	3	0	0	0	4	10	0	10
04:45 PM	0	0	0	5	0	0	0	0	1	0	0	1	0	0	0	0	6	1	7
Total	0	0	1	7	0	0	0	4	2	0	1	9	0	0	0	8	28	4	32
05:00 PM	0	0	1	1	0	1	0	2	0	0	0	6	0	2	1	0	9	5	14
05:15 PM	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	4	0	4
05:30 PM	0	0	0	6	0	3	0	4	0	0	0	0	0	0	0	0	10	3	13
05:45 PM	0	0	0	4	0	0	0	2	0	0	0	3	1	0	0	0	9	1	10
Total	0	0	1	13	0	4	0	8	0	0	0	11	1	2	1	0	32	9	41
Grand Total	0	0	2	20	0	4	0	12	2	0	1	20	1	2	1	8	60	13	73
Apprch %	0	0	100		0	100	0		66.7	0	33.3		25	50	25				
Total %	0	0	15.4		0	30.8	0		15.4	0	7.7		7.7	15.4	7.7		82.2	17.8	

	Brooks Rd From North				Lake St From East				Brooks Rd From South				Lake St From West						
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total		
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 04:45 PM																			
04:45 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1
05:00 PM	0	0	1	1	0	1	0	1	0	0	0	0	0	2	1	3	5		
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	3
Total Volume	0	0	1	1	0	4	0	4	1	0	0	1	0	2	1	3	9		
% App. Total	0	0	100		0	100	0		100	0	0		0	66.7	33.3				
PHF	.000	.000	.250	.250	.000	.333	.000	.333	.250	.000	.000	.250	.000	.250	.250	.250	.450		

PEDESTRIAN/BICYCLE COVID ADJUSTMENT CALCULATIONS

From the MassDOT Mobility Dashboard (<https://mobility-massdot.hub.arcgis.com/>)

Ped/Bike Change Sep 2019 vs Sep 2020	Brooks Avenue Peds Sep 2020	COVID Adjusted Volumes
Arlington	AM	57
31.53%	PM	42

From Mass Ave 2010 FDR Count 2008 From Minute Man at Dog Park Data

	Mass Avenue at Lake Street Peds	Increase 2010 to 2019	Adjusted Volumes
AM	94	54%	145
PM	67	37%	92

## K-FACTOR CALCULATION



Transportation Data Management System

## Volume Count Report

LOCATION INFO	
Location ID	4925
Type	SPOT
Fnct'l Class	3
Located On	WAVERLEY OAKS ROAD
Loc On Alias	WAVERLEY OAKS ROAD
WEST OF	BEAVER STREET
Direction	2-WAY
County	Middlesex
Community	Waltham
MPO ID	
HPMS ID	
Agency	MHD

COUNT DATA INFO	
Count Status	Accepted
Start Date	Wed 7/24/2019
End Date	Thu 7/25/2019
Start Time	10:00:00 AM
End Time	10:00:00 AM
Direction	
Notes	
Station	
Study	
Speed Limit	
Description	
Sensor Type	Tube Class
Source	
Latitude,Longitude	

Time	15-min Interval				Hourly Count
	1st	2nd	3rd	4th	
0:00-1:00	13	10	15	8	46
1:00-2:00	7	7	9	4	27
2:00-3:00	0	2	6	2	10
3:00-4:00	2	4	2	4	12
4:00-5:00	6	8	6	6	26
5:00-6:00	19	33	30	69	151
6:00-7:00	49	85	100	114	348
7:00-8:00	113	141	117	125	496
8:00-9:00	144	152	130	143	569
9:00-10:00	157	154	137	118	566
10:00-11:00	127	136	100	108	471
11:00-12:00	92	117	123	104	436
12:00-13:00	133	123	109	81	446
13:00-14:00	125	109	110	140	484
14:00-15:00	125	117	131	144	517
15:00-16:00	147	146	174	113	580
16:00-17:00	156	145	156	176	633
17:00-18:00	153	173	166	141	633
18:00-19:00	128	136	143	129	536
19:00-20:00	119	103	100	82	404
20:00-21:00	104	83	80	89	356
21:00-22:00	60	82	73	66	281
22:00-23:00	73	40	39	35	187
23:00-24:00	29	34	12	15	90
Total					8,305
AADT					7,803
AM Peak					08:45-09:45 591
PM Peak					16:45-17:45 668

K Factor = 668/8305 = 0.080



## Volume Count Report

LOCATION INFO	
Location ID	4911
Type	SPOT
Fnc'tl Class	3
Located On	WAVERLEY OAKS ROAD
Loc On Alias	WAVERLEY OAKS ROAD
WEST OF	TRAPELO ROAD
Direction	2-WAY
County	Middlesex
Community	Waltham
MPO ID	
HPMS ID	
Agency	MHD

COUNT DATA INFO	
Count Status	Accepted
Start Date	Tue 7/23/2019
End Date	Wed 7/24/2019
Start Time	10:00:00 AM
End Time	10:00:00 AM
Direction	
Notes	
Station	
Study	
Speed Limit	
Description	
Sensor Type	Tube Class
Source	
Latitude,Longitude	

Time	15-min Interval				Hourly Count
	1st	2nd	3rd	4th	
0:00-1:00	16	9	18	3	46
1:00-2:00	7	5	12	7	31
2:00-3:00	4	3	9	11	27
3:00-4:00	2	2	6	6	16
4:00-5:00	5	11	14	24	54
5:00-6:00	22	40	67	86	215
6:00-7:00	102	125	181	175	583
7:00-8:00	182	203	210	252	847
8:00-9:00	257	288	293	305	1,143
9:00-10:00	294	219	288	212	1,013
10:00-11:00	227	225	226	240	918
11:00-12:00	184	188	204	218	794
12:00-13:00	222	211	233	214	880
13:00-14:00	203	211	240	227	881
14:00-15:00	214	216	217	265	912
15:00-16:00	224	258	271	257	1,010
16:00-17:00	278	262	284	280	1,104
17:00-18:00	316	292	341	259	1,208
18:00-19:00	278	282	269	218	1,047
19:00-20:00	185	207	161	147	700
20:00-21:00	150	162	124	111	547
21:00-22:00	105	94	108	89	396
22:00-23:00	72	60	42	52	226
23:00-24:00	52	39	28	22	141
Total					14,739
AADT					13,658
AM Peak					08:15-09:15 1,180
PM Peak					16:45-17:45 1,229

K Factor = 1229/14739 = 0.083

VEHICLE OCCUPANCY RATE

# COMMUTING CHARACTERISTICS BY SEX

Note: This is a modified view of the original table produced by the U.S. Census Bureau. This download or printed version may have missing information from the original table.

Census Tract 3561, Middlesex County, Massachusetts					
		Total	Male		
Label		Estimate	Margin of Error		Estimate
▼ Workers 16 years and over		2,051	±155		1,048
▼ MEANS OF TRANSPORTATION TO WORK					
▼ Car, truck, or van		54.5%	±7.2		57.7%
Drove alone		42.9%	±7.6		45.8%
▼ Carpooled		11.6%	±4.5		11.9%
In 2-person carpool		9.6%	±4.2		9.9%
In 3-person carpool		1.5%	±1.8		1.0%
In 4-or-more person carpool		0.5%	±0.8		1.0%
Workers per car, truck, or van		1.13	±0.06		1.13
Public transportation (excluding taxicab)		31.6%	±6.4		29.4%
Walked		0.0%	±1.7		0.0%
Bicycle		6.1%	±2.8		7.8%
Taxicab, motorcycle, or other means		1.3%	±2.0		0.0%
Worked at home		6.5%	±3.6		5.1%
▼ PLACE OF WORK					
▼ Worked in state of residence		98.1%	±1.5		97.9%
Worked in county of residence		65.1%	±6.2		61.6%
Worked outside county of residence		33.0%	±6.3		36.3%
Worked outside state of residence		1.9%	±1.5		2.1%
▼ Living in a place		100.0%	±1.7		100.0%
Worked in place of residence		11.2%	±4.0		7.6%
Worked outside place of residence		88.8%	±4.0		92.4%
Not living in a place		0.0%	±1.7		0.0%
▼ Living in 12 selected states		100.0%	±1.7		100.0%
Worked in minor civil division of residence		11.2%	±4.0		7.6%
Worked outside minor civil division of residence		88.8%	±4.0		92.4%
Not living in 12 selected states		0.0%	±1.7		0.0%
▼ Workers 16 years and over who did not work at home		1,918	±178		995
▼ TIME LEAVING HOME TO GO TO WORK					
12:00 a.m. to 4:59 a.m.		0.9%	±1.4		0.0%
5:00 a.m. to 5:29 a.m.		0.4%	±0.7		0.0%
5:30 a.m. to 5:59 a.m.		3.2%	±2.2		1.7%
6:00 a.m. to 6:29 a.m.		2.1%	±1.9		2.8%
6:30 a.m. to 6:59 a.m.		10.5%	±4.2		11.5%
7:00 a.m. to 7:29 a.m.		17.8%	±5.9		21.6%
7:30 a.m. to 7:59 a.m.		21.8%	±6.0		22.6%
8:00 a.m. to 8:29 a.m.		16.1%	±5.0		13.8%

## Table Notes

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### COMMUTING CHARACTERISTICS BY SEX

**Survey/Program:**

American Community Survey

**Year:**

2018

**Estimates:**

5-Year

**Table ID:**

S0801

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

Source: U.S. Census Bureau, 2014-2018 American Community Survey 5-Year Estimates

When information is missing or inconsistent, the Census Bureau logically assigns an acceptable value using the response to a related question or questions. If a logical assignment is not possible, data are filled using a statistical process called allocation, which uses a similar individual or household to provide a donor value. The "Allocated" section is the number of respondents who received an allocated value for a particular subject.

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see ACS Technical Documentation ). The effect of nonsampling error is not represented in these tables.

The 12 selected states are Connecticut, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin.

Workers include members of the Armed Forces and civilians who were at work last week.

While the 2014-2018 American Community Survey (ACS) data generally reflect the February 2013 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

**Explanation of Symbols:**

An "\*\*" entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.

An "-" entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution, or the margin of error associated with a median was larger than the median itself.

An "--" following a median estimate means the median falls in the lowest interval of an open-ended distribution.

An "+" following a median estimate means the median falls in the upper interval of an open-ended distribution.

An "\*\*\*" entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.

An "\*\*\*\*\*" entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.

An "N" entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.

An "(X)" means that the estimate is not applicable or not available.

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

**MODE SPLIT DATA**

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# CITY OF CAMBRIDGE

## TDM Annual Report Summary—2019

*If survey indicates more residents are parking off-site, please indicate where they park:*

The majority of respondents park on site representing 72 percent of the respondents. Eight percent park on-street (resident parking) and 7 percent park in other off-site facilities.

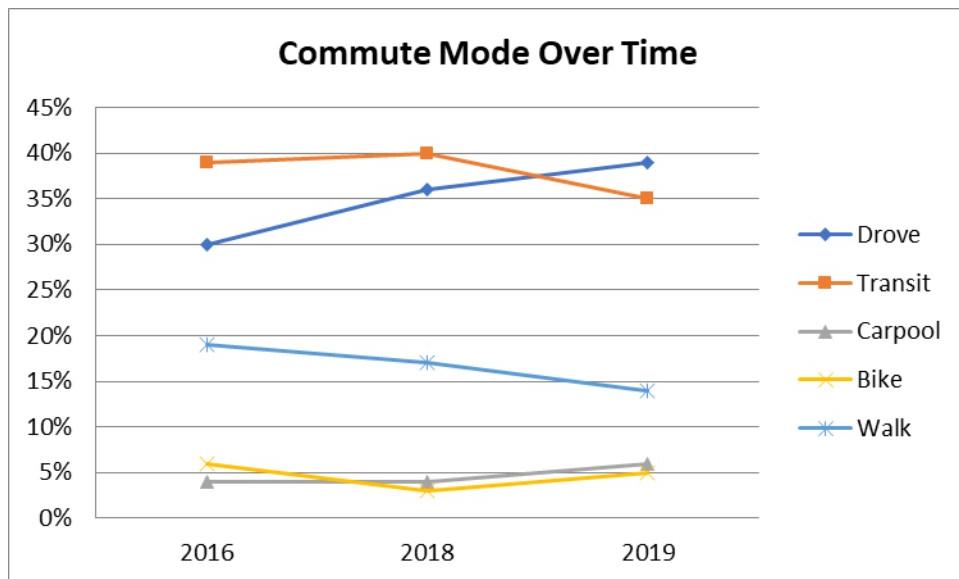
*How is the parking facility physically controlled to ensure it is not open to the general public or operated as a commercial facility (as defined above)?*

Garage access is by transponder only and is controlled by management office for residential use only.

**Anything else you'd like the City to know about this project related to TDM (that was not discussed elsewhere in this report).**

Not at this time.

**Attach line graph of all modes over time (walk, bike, transit, carpool, drive alone).**



**Attach driveway counts, car parking counts, and bicycle parking counts, if required this year.**

Not required this year.

PEDESTRIAN PATH TO ALEWIFE STATION FIGURE

Transportation Impact Assessment - Thorndike Place - Arlington, Massachusetts



**V** Vanasse & Associates inc

Pedestrian Walkway Path to Alewife Station

## CAPACITY ANALYSIS

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2020 Baseline Weekday Morning Peak Hour  
2020 Baseline Weekday Evening Peak Hour  
2027 No-Build Weekday Morning Peak Hour  
2027 No-Build Weekday Evening Peak Hour  
2027 Build Weekday Morning Peak Hour  
2027 Build Weekday Evening Peak Hour

2020 Baseline Weekday Morning Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↓	↔		
Traffic Vol, veh/h	574	3	1	1121	5	1
Future Vol, veh/h	574	3	1	1121	5	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	87	87	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	765	4	1	1289	7	1
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	769	0	2058	767
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	1291	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	854	-	61	405
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	260	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	854	-	61	405
Mov Cap-2 Maneuver	-	-	-	-	61	-
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	259	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	62			
HCM LOS			F			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	71	-	-	854	-	
HCM Lane V/C Ratio	0.113	-	-	0.001	-	
HCM Control Delay (s)	62	-	-	9.2	0	
HCM Lane LOS	F	-	-	A	A	
HCM 95th %tile Q(veh)	0.4	-	-	0	-	

Intersection						
Int Delay, s/veh	1.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	561	14	5	1098	24	6
Future Vol, veh/h	561	14	5	1098	24	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	93	93	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	748	19	5	1181	32	8
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	767	0	1949	758
Stage 1	-	-	-	-	758	-
Stage 2	-	-	-	-	1191	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	856	-	72	410
Stage 1	-	-	-	-	466	-
Stage 2	-	-	-	-	291	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	856	-	71	410
Mov Cap-2 Maneuver	-	-	-	-	71	-
Stage 1	-	-	-	-	466	-
Stage 2	-	-	-	-	286	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	80.4			
HCM LOS			F			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	85	-	-	856	-	
HCM Lane V/C Ratio	0.471	-	-	0.006	-	
HCM Control Delay (s)	80.4	-	-	9.2	0	
HCM Lane LOS	F	-	-	A	A	
HCM 95th %tile Q(veh)	2	-	-	0	-	

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	562	5	3	1096	7	1
Future Vol, veh/h	562	5	3	1096	7	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	93	93	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	749	7	3	1178	9	1
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	756	0	1937	753
Stage 1	-	-	-	-	753	-
Stage 2	-	-	-	-	1184	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	864	-	73	413
Stage 1	-	-	-	-	469	-
Stage 2	-	-	-	-	293	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	864	-	72	413
Mov Cap-2 Maneuver	-	-	-	-	72	-
Stage 1	-	-	-	-	469	-
Stage 2	-	-	-	-	290	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	56.8			
HCM LOS			F			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	80	-	-	864	-	
HCM Lane V/C Ratio	0.133	-	-	0.004	-	
HCM Control Delay (s)	56.8	-	-	9.2	0	
HCM Lane LOS	F	-	-	A	A	
HCM 95th %tile Q(veh)	0.4	-	-	0	-	

## Intersection

Int Delay, s/veh

1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Lane Configurations</b>												
Traffic Vol, veh/h	0	545	18	8	1080	5	8	0	14	4	0	11
Future Vol, veh/h	0	545	18	8	1080	5	8	0	14	4	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	96	96	96	80	80	80	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0	0	0	10	0	0	0
Mvmt Flow	0	690	23	8	1125	5	10	0	18	4	0	12

Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	1130	0	0	713	0	0	1852	1848	702	1855	1857	1128
Stage 1	-	-	-	-	-	-	702	702	-	1144	1144	-
Stage 2	-	-	-	-	-	-	1150	1146	-	711	713	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.3	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.39	3.5	4	3.3
Pot Cap-1 Maneuver	626	-	-	896	-	-	58	75	425	57	74	251
Stage 1	-	-	-	-	-	-	432	443	-	245	277	-
Stage 2	-	-	-	-	-	-	243	276	-	427	438	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	626	-	-	896	-	-	54	73	425	54	72	251
Mov Cap-2 Maneuver	-	-	-	-	-	-	54	73	-	54	72	-
Stage 1	-	-	-	-	-	-	432	443	-	245	270	-
Stage 2	-	-	-	-	-	-	226	269	-	409	438	-

Approach	EB	WB		NB		SB	
HCM Control Delay, s	0	0.1		43.3		37.5	
HCM LOS				E		E	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	121	626	-	-	896	-	-	127
HCM Lane V/C Ratio	0.227	-	-	-	0.009	-	-	0.128
HCM Control Delay (s)	43.3	0	-	-	9.1	0	-	37.5
HCM Lane LOS	E	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	0.8	0	-	-	0	-	-	0.4

## Intersection

Int Delay, s/veh 3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Lane Configurations</b>												
Traffic Vol, veh/h	3	553	7	24	1069	3	9	0	22	3	0	15
Future Vol, veh/h	3	553	7	24	1069	3	9	0	22	3	0	15
Conflicting Peds, #/hr	0	0	0	304	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	97	97	97	75	75	75	75	75	75
Heavy Vehicles, %	0	2	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	4	658	8	25	1102	3	12	0	29	4	0	20

Major/Minor	Major1	Major2			Minor1			Minor2				
Conflicting Flow All	1105	0	0	970	0	0	2138	2129	966	1839	2132	1104
Stage 1	-	-	-	-	-	-	974	974	-	1154	1154	-
Stage 2	-	-	-	-	-	-	1164	1155	-	685	978	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	639	-	-	719	-	-	36	50	311	59	50	259
Stage 1	-	-	-	-	-	-	305	333	-	242	274	-
Stage 2	-	-	-	-	-	-	239	274	-	441	331	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	639	-	-	537	-	-	22	33	232	46	33	259
Mov Cap-2 Maneuver	-	-	-	-	-	-	22	33	-	46	33	-
Stage 1	-	-	-	-	-	-	225	246	-	240	241	-
Stage 2	-	-	-	-	-	-	194	241	-	381	245	-

Approach	EB	WB			NB			SB			
HCM Control Delay, s	0.1	0.3			139.9			34.4			
HCM LOS					F			D			
<hr/>											
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)	62	639	-	-	537	-	-	146			
HCM Lane V/C Ratio	0.667	0.006	-	-	0.046	-	-	0.164			
HCM Control Delay (s)	139.9	10.7	0	-	12	0	-	34.4			
HCM Lane LOS	F	B	A	-	B	A	-	D			
HCM 95th %tile Q(veh)	2.9	0	-	-	0.1	-	-	0.6			



Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Lane Configurations	↑ ↗	↑ ↗	↑ ↗ ↘	↑ ↗	↖ ↗	↑ ↗	
Traffic Volume (vph)	247	279	822	580	381	438	
Future Volume (vph)	247	279	822	580	381	438	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	11	10	11	12	
Storage Length (ft)	0	100		55	150		
Storage Lanes	1	1		1	1		
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00	
Fr <sub>t</sub>		0.850		0.850			
Flt Protected	0.950				0.950		
Satd. Flow (prot)	2025	1812	3421	1492	1728	1863	
Flt Permitted	0.950				0.157		
Satd. Flow (perm)	2025	1812	3421	1492	286	1863	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		246		209			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1126		640			645	
Travel Time (s)	25.6		14.5			14.7	
Peak Hour Factor	0.91	0.91	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%	
Adj. Flow (vph)	271	307	893	630	414	476	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	271	307	893	630	414	476	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	16		11			11	
Link Offset(ft)	0		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.04	1.09	1.04	1.00	
Turning Speed (mph)	15	9		9	15		
Number of Detectors	1	1	2	1	1	2	
Detector Template	Left	Right	Thru	Right	Left	Thru	
Leading Detector (ft)	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	
Detector 1 Size(ft)	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)			94		94		
Detector 2 Size(ft)			6		6		
Detector 2 Type			Cl+Ex		Cl+Ex		
Detector 2 Channel							
Detector 2 Extend (s)			0.0		0.0		
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA	



Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Protected Phases	4		6		5	2	9
Permitted Phases			4		6	2	
Detector Phase	4	4	6	6	5	2	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0	23.0	23.0	23.0	10.0	23.0	19.0
Total Split (s)	29.0	29.0	38.0	38.0	15.0	53.0	23.0
Total Split (%)	27.6%	27.6%	36.2%	36.2%	14.3%	50.5%	22%
Maximum Green (s)	22.0	22.0	31.0	31.0	9.0	46.0	20.0
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	2.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.0	7.0	
Lead/Lag			Lag	Lag	Lead		
Lead-Lag Optimize?			Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max	None
Walk Time (s)							5.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							35
Act Effct Green (s)	16.6	16.6	31.8	31.8	48.2	47.2	
Actuated g/C Ratio	0.19	0.19	0.36	0.36	0.55	0.53	
v/c Ratio	0.72	0.57	0.72	0.94	1.35	0.48	
Control Delay	46.0	12.9	31.4	44.8	198.8	18.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	46.0	12.9	31.4	44.8	198.8	18.1	
LOS	D	B	C	D	F	B	
Approach Delay	28.4		36.9			102.1	
Approach LOS	C		D			F	

## Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 88.3

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.35

Intersection Signal Delay: 54.7

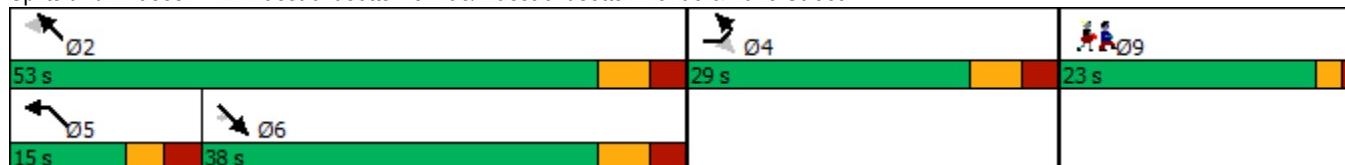
Intersection LOS: D

Intersection Capacity Utilization 74.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Massachusetts Avenue/Massachusetts Avenue &amp; Lake Street



## Queues

2020 Baseline Weekday Morning Peak Hour

## 2: Massachusetts Avenue/Massachusetts Avenue &amp; Lake Street

01/14/2021



Lane Group	EBL	EBR	SET	SER	NWL	NWT
Lane Group Flow (vph)	271	307	893	630	414	476
v/c Ratio	0.72	0.57	0.72	0.94	1.35	0.48
Control Delay	46.0	12.9	31.4	44.8	198.8	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.0	12.9	31.4	44.8	198.8	18.1
Queue Length 50th (ft)	159	32	265	~302	~287	200
Queue Length 95th (ft)	245	110	#371	#561	#502	317
Internal Link Dist (ft)	1046		560			565
Turn Bay Length (ft)		100		55	150	
Base Capacity (vph)	517	646	1232	671	307	996
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.48	0.72	0.94	1.35	0.48

## Intersection Summary

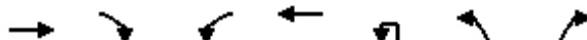
- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

## Lanes, Volumes, Timings

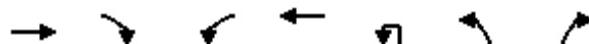
## 5: Route 2 EB On/Off Ramps &amp; Lake Street

2020 Baseline Weekday Morning Peak Hour

01/14/2021



Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑	↖	↗	↑
Traffic Volume (vph)	284	435	166	390	253	208	493
Future Volume (vph)	284	435	166	390	253	208	493
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	10	11	12	16	14
Storage Length (ft)		150	110		0	0	
Storage Lanes		1	1		1	1	
Taper Length (ft)			25		25		
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Fr <sub>t</sub>		0.850				0.850	
Flt Protected			0.950			0.950	
Satd. Flow (prot)	2132	1812	1685	3455	0	2036	1706
Flt Permitted			0.950			0.950	
Satd. Flow (perm)	2132	1812	1685	3455	0	2036	1706
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		322				407	
Link Speed (mph)	30			30		30	
Link Distance (ft)	239			505		387	
Travel Time (s)	5.4			11.5		8.8	
Peak Hour Factor	0.91	0.91	0.84	0.84	0.91	0.91	0.91
Heavy Vehicles (%)	1%	1%	0%	1%	0%	1%	1%
Adj. Flow (vph)	312	478	198	464	278	229	542
Shared Lane Traffic (%)							
Lane Group Flow (vph)	312	478	198	464	0	507	542
Enter Blocked Intersection	No						
Lane Alignment	Left	Right	Left	Left	R NA	Left	Right
Median Width(ft)	12			12		16	
Link Offset(ft)	0			0		0	
Crosswalk Width(ft)	16			16		16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.09	1.04	1.00	0.85	0.92
Turning Speed (mph)		9	15		9	15	9
Number of Detectors	2	1	1	2	1	1	1
Detector Template	Thru	Right	Left	Thru	Left	Left	Right
Leading Detector (ft)	100	20	20	100	20	20	20
Trailing Detector (ft)	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20	20
Detector 1 Type	Cl+Ex						
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94		94				
Detector 2 Size(ft)	6		6				
Detector 2 Type	Cl+Ex		Cl+Ex				
Detector 2 Channel							
Detector 2 Extend (s)	0.0		0.0				
Turn Type	NA	Free	Prot	NA	Perm	Prot	Perm



Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Protected Phases	4		3	8		2	
Permitted Phases		Free			2		2
Detector Phase	4		3	8	2	2	2
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0		9.0	21.0	21.0	21.0	21.0
Total Split (s)	74.0		25.0	99.0	21.0	21.0	21.0
Total Split (%)	61.7%		20.8%	82.5%	17.5%	17.5%	17.5%
Maximum Green (s)	69.0		20.0	94.0	16.0	16.0	16.0
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max	Max
Walk Time (s)	5.0			5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0	0
Act Effct Green (s)	14.3	57.9	12.2	31.6		16.2	16.2
Actuated g/C Ratio	0.25	1.00	0.21	0.55		0.28	0.28
v/c Ratio	0.59	0.26	0.56	0.25		0.89	0.70
Control Delay	24.7	0.4	27.5	7.0		44.0	12.1
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	24.7	0.4	27.5	7.0		44.0	12.1
LOS	C	A	C	A		D	B
Approach Delay	10.0			13.1		27.5	
Approach LOS	A			B		C	

## Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 57.9

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 18.2

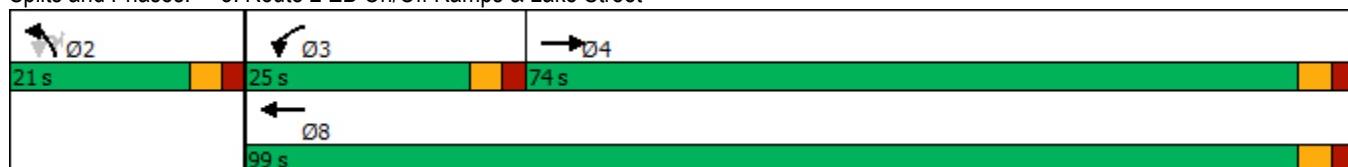
Intersection LOS: B

Intersection Capacity Utilization 62.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 5: Route 2 EB On/Off Ramps &amp; Lake Street



## Queues

## 5: Route 2 EB On/Off Ramps &amp; Lake Street

2020 Baseline Weekday Morning Peak Hour

01/14/2021



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	312	478	198	464	507	542
v/c Ratio	0.59	0.26	0.56	0.25	0.89	0.70
Control Delay	24.7	0.4	27.5	7.0	44.0	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.7	0.4	27.5	7.0	44.0	12.1
Queue Length 50th (ft)	95	0	62	39	167	36
Queue Length 95th (ft)	176	0	116	53	#400	#191
Internal Link Dist (ft)	159			425	307	
Turn Bay Length (ft)		150	110			
Base Capacity (vph)	2132	1812	588	3455	568	769
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.26	0.34	0.13	0.89	0.70

## Intersection Summary

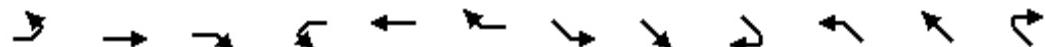
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Lanes, Volumes, Timings  
7: Route 2 WB Off Ramp & Lake Street

2020 Baseline Weekday Morning Peak Hour

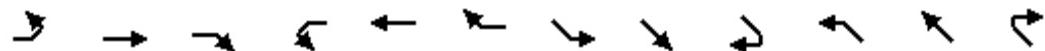
01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	210	567	0	0	435	691	0	0	0	121	6	10
Future Volume (vph)	210	567	0	0	435	691	0	0	0	121	6	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	10	12	12	12	11	12	16
Storage Length (ft)	250			0	0	75	0		0	100		0
Storage Lanes	1			0	0	1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Fr <sub>t</sub>						0.850						0.850
Flt Protected	0.950									0.950	0.956	
Satd. Flow (prot)	1805	1881	0	0	1837	1492	0	0	0	1579	1583	1830
Flt Permitted	0.950									0.950	0.956	
Satd. Flow (perm)	1805	1881	0	0	1837	1492	0	0	0	1579	1583	1830
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						520						136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			380			459			529	
Travel Time (s)		11.5			8.6			10.4			12.0	
Peak Hour Factor	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92	0.81	0.81	0.81
Heavy Vehicles (%)	0%	1%	0%	0%	0%	1%	0%	0%	0%	5%	50%	0%
Adj. Flow (vph)	239	644	0	0	473	751	0	0	0	149	7	12
Shared Lane Traffic (%)										48%		
Lane Group Flow (vph)	239	644	0	0	473	751	0	0	0	77	79	12
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.04	1.09	1.00	1.00	1.00	1.04	1.00	0.85
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2	1				1	2	1
Detector Template	Left	Thru			Thru	Right				Left	Thru	Right
Leading Detector (ft)	20	100			100	20				20	100	20
Trailing Detector (ft)	0	0			0	0				0	0	0
Detector 1 Position(ft)	0	0			0	0				0	0	0
Detector 1 Size(ft)	20	6			6	20				20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex				Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Prot	NA			NA	Perm				Split	NA	Perm

Lanes, Volumes, Timings  
7: Route 2 WB Off Ramp & Lake Street

2020 Baseline Weekday Morning Peak Hour  
01/14/2021



Lane Group	EBL	EBT	EBC	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Protected Phases	7	4			8					2	2	
Permitted Phases						8						2
Detector Phase	7	4			8	8				2	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Minimum Split (s)	8.5	22.0			22.0	22.0				22.0	22.0	22.0
Total Split (s)	16.0	38.0			22.0	22.0				22.0	22.0	22.0
Total Split (%)	26.7%	63.3%			36.7%	36.7%				36.7%	36.7%	36.7%
Maximum Green (s)	11.5	32.0			16.0	16.0				16.0	16.0	16.0
Yellow Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
All-Red Time (s)	0.5	2.0			2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0			6.0	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Recall Mode	None	None			None	None				Max	Max	Max
Walk Time (s)		5.0			5.0	5.0				5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0	11.0				11.0	11.0	11.0
Pedestrian Calls (#/hr)	0				0	0				0	0	0
Act Effct Green (s)	10.8	31.4			16.0	16.0				16.0	16.0	16.0
Actuated g/C Ratio	0.18	0.53			0.27	0.27				0.27	0.27	0.27
v/c Ratio	0.73	0.65			0.96	0.96				0.18	0.19	0.02
Control Delay	37.8	13.8			56.5	34.1				18.4	18.4	0.1
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	37.8	13.8			56.5	34.1				18.4	18.4	0.1
LOS	D	B			E	C				B	B	A
Approach Delay		20.3			42.7						17.1	
Approach LOS		C			D						B	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 59.4

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 32.1

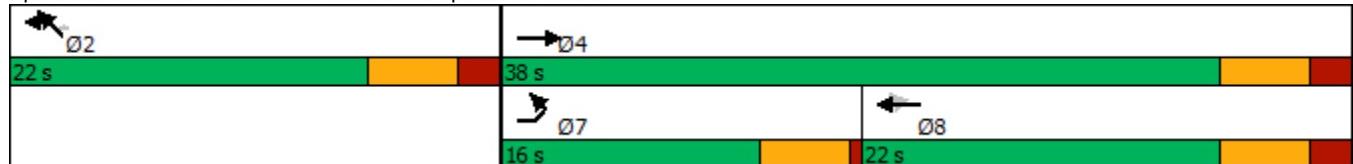
Intersection LOS: C

Intersection Capacity Utilization 71.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 7: Route 2 WB Off Ramp & Lake Street



## Queues

2020 Baseline Weekday Morning Peak Hour

## 7: Route 2 WB Off Ramp &amp; Lake Street

01/14/2021



Lane Group	EBL	EBT	WBT	WBR	NWL	NWT	NWR
Lane Group Flow (vph)	239	644	473	751	77	79	12
v/c Ratio	0.73	0.65	0.96	0.96	0.18	0.19	0.02
Control Delay	37.8	13.8	56.5	34.1	18.4	18.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.8	13.8	56.5	34.1	18.4	18.4	0.1
Queue Length 50th (ft)	81	150	168	80	22	23	0
Queue Length 95th (ft)	#164	238	#335	#314	47	48	0
Internal Link Dist (ft)			425	300		449	
Turn Bay Length (ft)	250			75	100		
Base Capacity (vph)	349	1014	495	782	426	427	592
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.64	0.96	0.96	0.18	0.19	0.02

## Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

## Lanes, Volumes, Timings

11: Route 2/Alewife Brook Parkway &amp; Route 16

2020 Baseline Weekday Morning Peak Hour

01/14/2021



Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Lane Configurations			↑↑			↑↑		
Traffic Volume (vph)	0	0	1523	0	0	1019		
Future Volume (vph)	0	0	1523	0	0	1019		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.88		
Frt						0.850		
Flt Protected								
Satd. Flow (prot)	0	0	4729	0	0	2617		
Flt Permitted								
Satd. Flow (perm)	0	0	4729	0	0	2617		
Right Turn on Red				Yes		Yes		
Satd. Flow (RTOR)						9		
Link Speed (mph)		30	30		30			
Link Distance (ft)		201	192		296			
Travel Time (s)		4.6	4.4		6.7			
Peak Hour Factor	0.92	0.92	0.90	0.92	0.92	0.85		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	1%		
Adj. Flow (vph)	0	0	1692	0	0	1199		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	1692	0	0	1199		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		0	0		0			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	15			9	15	30		
Number of Detectors			2			1		
Detector Template			Thru		Right			
Leading Detector (ft)			100		20			
Trailing Detector (ft)			0		0			
Detector 1 Position(ft)			0		0			
Detector 1 Size(ft)			6		20			
Detector 1 Type			Cl+Ex		Cl+Ex			
Detector 1 Channel								
Detector 1 Extend (s)			0.0		0.0			
Detector 1 Queue (s)			0.0		0.0			
Detector 1 Delay (s)			0.0		0.0			
Detector 2 Position(ft)			94					
Detector 2 Size(ft)			6					
Detector 2 Type			Cl+Ex					
Detector 2 Channel								
Detector 2 Extend (s)			0.0					
Turn Type			NA		custom			
Protected Phases			2		3 4	3	4	
Permitted Phases								
Detector Phase			2		3 4			

## Lanes, Volumes, Timings

11: Route 2/Alewife Brook Parkway &amp; Route 16

2020 Baseline Weekday Morning Peak Hour

01/14/2021



Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
<b>Switch Phase</b>								
Minimum Initial (s)								
					10.0		10.0	10.0
Minimum Split (s)								
					15.0		19.0	15.0
Total Split (s)								
					58.0		36.0	26.0
Total Split (%)								
					48.3%		30%	22%
Maximum Green (s)								
					53.0		30.0	21.0
Yellow Time (s)								
					4.0		4.0	3.5
All-Red Time (s)								
					1.0		2.0	1.5
Lost Time Adjust (s)								
					0.0			
Total Lost Time (s)								
					5.0			
<b>Lead/Lag</b>								
Lead-Lag Optimize?								
Vehicle Extension (s)								
					3.0		3.0	3.0
Recall Mode								
					C-Max		Max	Max
Walk Time (s)								
							5.0	
Flash Dont Walk (s)								
							8.0	
Pedestrian Calls (#/hr)								
							0	
Act Effect Green (s)								
					53.0		56.0	
Actuated g/C Ratio								
					0.44		0.47	
v/c Ratio								
					0.81		0.98	
Control Delay								
					5.7		52.6	
Queue Delay								
					2.3		0.0	
Total Delay								
					8.0		52.6	
LOS								
					A		D	
Approach Delay								
					8.0		52.6	
Approach LOS								
					A		D	

**Intersection Summary**

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 26.5

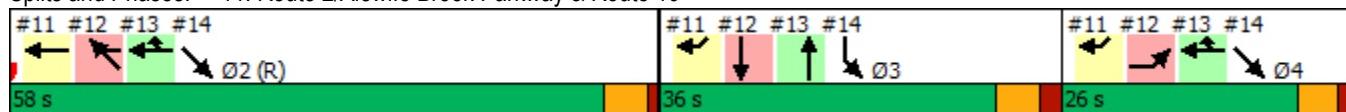
Intersection LOS: C

Intersection Capacity Utilization 81.5%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 11: Route 2/Alewife Brook Parkway &amp; Route 16





Lane Group	WBT	SWR
Lane Group Flow (vph)	1692	1199
v/c Ratio	0.81	0.98
Control Delay	5.7	52.6
Queue Delay	2.3	0.0
Total Delay	8.0	52.6
Queue Length 50th (ft)	41	502
Queue Length 95th (ft)	m40	#613
Internal Link Dist (ft)	112	
Turn Bay Length (ft)		
Base Capacity (vph)	2088	1226
Starvation Cap Reductn	262	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.93	0.98

**Intersection Summary**

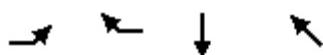
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lanes, Volumes, Timings  
12: Alewife Brook Parkway & Route 2

2020 Baseline Weekday Morning Peak Hour  
01/14/2021

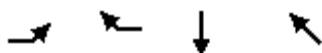


Lane Group	EBL	WBR	SBT	NWT
Lane Configurations	↑↑	↑	↑↑	↑↑
Traffic Volume (vph)	486	163	489	1360
Future Volume (vph)	486	163	489	1360
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	13	16	13	13
Lane Util. Factor	0.97	1.00	0.95	0.95
Frt	0.865			
Flt Protected	0.950			
Satd. Flow (prot)	3224	1581	3291	3291
Flt Permitted	0.950			
Satd. Flow (perm)	3224	1581	3291	3291
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)		30	30	
Link Distance (ft)		202	278	
Travel Time (s)		4.6	6.3	
Peak Hour Factor	0.97	0.94	0.85	0.90
Heavy Vehicles (%)	1%	6%	2%	2%
Adj. Flow (vph)	501	173	575	1511
Shared Lane Traffic (%)				
Lane Group Flow (vph)	501	173	575	1511
Enter Blocked Intersection	No	No	No	No
Lane Alignment	Left	R NA	Left	L NA
Median Width(ft)		0	0	
Link Offset(ft)		0	0	
Crosswalk Width(ft)		16	16	
Two way Left Turn Lane				
Headway Factor	1.10	0.97	1.10	1.10
Turning Speed (mph)	15	30		
Number of Detectors	1	1	2	2
Detector Template	Left	Right	Thru	Thru
Leading Detector (ft)	20	20	100	100
Trailing Detector (ft)	0	0	0	0
Detector 1 Position(ft)	0	0	0	0
Detector 1 Size(ft)	20	20	6	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel				
Detector 1 Extend (s)	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94	94	
Detector 2 Size(ft)		6	6	
Detector 2 Type		Cl+Ex	Cl+Ex	
Detector 2 Channel				
Detector 2 Extend (s)		0.0	0.0	
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	2!	3	2!
Permitted Phases				
Detector Phase	4	2	3	2

Lanes, Volumes, Timings  
12: Alewife Brook Parkway & Route 2

2020 Baseline Weekday Morning Peak Hour

01/14/2021



Lane Group	EBL	WBR	SBT	NWT
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.0	15.0	19.0	15.0
Total Split (s)	26.0	58.0	36.0	58.0
Total Split (%)	21.7%	48.3%	30.0%	48.3%
Maximum Green (s)	21.0	53.0	30.0	53.0
Yellow Time (s)	3.5	4.0	4.0	4.0
All-Red Time (s)	1.5	1.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.0	5.0
Lead/Lag	Lag	Lead		
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	C-Max	Max	C-Max
Walk Time (s)			5.0	
Flash Dont Walk (s)			8.0	
Pedestrian Calls (#/hr)			0	
Act Effect Green (s)	21.0	53.0	30.0	53.0
Actuated g/C Ratio	0.18	0.44	0.25	0.44
v/c Ratio	0.89	0.25	0.70	1.04
Control Delay	67.3	14.2	46.2	68.0
Queue Delay	0.0	2.4	0.0	0.8
Total Delay	67.3	16.6	46.2	68.8
LOS	E	B	D	E
Approach Delay			46.2	68.8
Approach LOS			D	E

Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 60.6

Intersection LOS: E

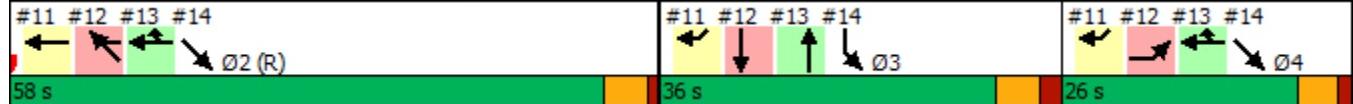
Intersection Capacity Utilization 100.1%

ICU Level of Service G

Analysis Period (min) 15

! Phase conflict between lane groups.

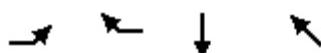
Splits and Phases: 12: Alewife Brook Parkway & Route 2



Queues  
12: Alewife Brook Parkway & Route 2

2020 Baseline Weekday Morning Peak Hour

01/14/2021



Lane Group	EBL	WBR	SBT	NWT
Lane Group Flow (vph)	501	173	575	1511
v/c Ratio	0.89	0.25	0.70	1.04
Control Delay	67.3	14.2	46.2	68.0
Queue Delay	0.0	2.4	0.0	0.8
Total Delay	67.3	16.6	46.2	68.8
Queue Length 50th (ft)	197	82	213	~665
Queue Length 95th (ft)	#291	134	259	#804
Internal Link Dist (ft)			122	198
Turn Bay Length (ft)				
Base Capacity (vph)	564	698	822	1453
Starvation Cap Reductn	0	405	0	0
Spillback Cap Reductn	0	1	0	3
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.89	0.59	0.70	1.04

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

## Lanes, Volumes, Timings

2020 Baseline Weekday Morning Peak Hour

13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	163	52	0	216	0	0	0	0
Future Volume (vph)	0	0	0	0	163	52	0	216	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0					200	0		0	0	0	0
Storage Lanes	0					1	0		0	0	0	0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr <sub>t</sub>							0.850					
Flt Protected												
Satd. Flow (prot)	0	0	0	0	1613	1333	0	3154	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	1613	1333	0	3154	0	0	0	0
Right Turn on Red				No		No	No		No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		161			1225			227			185	
Travel Time (s)		3.7			27.8			5.2			4.2	
Confl. Peds. (#/hr)						2						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	6%	9%	2%	3%	2%	2%	2%	2%
Adj. Flow (vph)	0	0	0	0	177	57	0	240	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	177	57	0	240	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	0				0			0			0	
Link Offset(ft)	0				0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors					2	1		2				
Detector Template						Thru	Right		Thru			
Leading Detector (ft)					100	20		100				
Trailing Detector (ft)					0	0		0				
Detector 1 Position(ft)					0	0		0				
Detector 1 Size(ft)					6	20		6				
Detector 1 Type					Cl+Ex	Cl+Ex		Cl+Ex				
Detector 1 Channel												
Detector 1 Extend (s)					0.0	0.0		0.0				
Detector 1 Queue (s)					0.0	0.0		0.0				
Detector 1 Delay (s)					0.0	0.0		0.0				
Detector 2 Position(ft)					94			94				
Detector 2 Size(ft)					6			6				
Detector 2 Type					Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				

Lane Group	Ø2	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		

## Lanes, Volumes, Timings

13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access

2020 Baseline Weekday Morning Peak Hour

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type					NA	Prot		NA				
Protected Phases					24	24			3			
Permitted Phases												
Detector Phase					24	24			3			
Switch Phase												
Minimum Initial (s)								10.0				
Minimum Split (s)								19.0				
Total Split (s)								36.0				
Total Split (%)								30.0%				
Maximum Green (s)								30.0				
Yellow Time (s)								4.0				
All-Red Time (s)								2.0				
Lost Time Adjust (s)								0.0				
Total Lost Time (s)								6.0				
Lead/Lag								Lead				
Lead-Lag Optimize?												
Vehicle Extension (s)								3.0				
Recall Mode								Max				
Walk Time (s)								5.0				
Flash Dont Walk (s)								8.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)					79.0	79.0		30.0				
Actuated g/C Ratio					0.66	0.66		0.25				
v/c Ratio					0.17	0.06		0.30				
Control Delay					8.3	7.6		37.8				
Queue Delay					0.1	0.0		0.0				
Total Delay					8.4	7.6		37.8				
LOS					A	A		D				
Approach Delay					8.2			37.8				
Approach LOS					A			D				

## Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 23.2

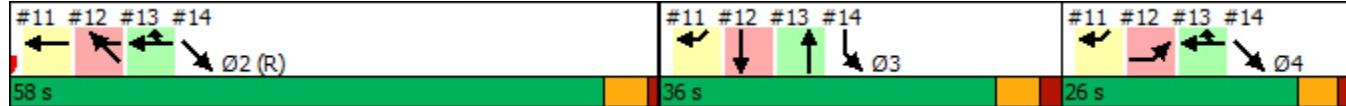
Intersection LOS: C

Intersection Capacity Utilization 27.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access



Lane Group	Ø2	Ø4
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	15.0	15.0
Total Split (s)	58.0	26.0
Total Split (%)	48%	22%
Maximum Green (s)	53.0	21.0
Yellow Time (s)	4.0	3.5
All-Red Time (s)	1.0	1.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	C-Max	Max
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		



Lane Group	WBT	WBR	NBT
Lane Group Flow (vph)	177	57	240
v/c Ratio	0.17	0.06	0.30
Control Delay	8.3	7.6	37.8
Queue Delay	0.1	0.0	0.0
Total Delay	8.4	7.6	37.8
Queue Length 50th (ft)	48	15	80
Queue Length 95th (ft)	78	30	117
Internal Link Dist (ft)	1145		147
Turn Bay Length (ft)		200	
Base Capacity (vph)	1061	877	788
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	203	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.21	0.06	0.30

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**Intersection Summary**

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Lanes, Volumes, Timings  
14: Alewife Brook Parkway & Route 2

2020 Baseline Weekday Morning Peak Hour

01/14/2021



Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Lane Configurations	1	1	1	1	1	1	1	1
Traffic Volume (vph)	489	0	0	1064	0	0		
Future Volume (vph)	489	0	0	1064	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	1.00		
Frt								
Flt Protected	0.950							
Satd. Flow (prot)	3193	0	0	3324	0	0		
Flt Permitted	0.950							
Satd. Flow (perm)	3193	0	0	3324	0	0		
Right Turn on Red	Yes	Yes			Yes			
Satd. Flow (RTOR)	234							
Link Speed (mph)	30			30	30			
Link Distance (ft)	155			297	139			
Travel Time (s)	3.5			6.8	3.2			
Peak Hour Factor	0.85	0.92	0.92	0.97	0.92	0.92		
Heavy Vehicles (%)	2%	2%	2%	1%	2%	2%		
Adj. Flow (vph)	575	0	0	1097	0	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	575	0	0	1097	0	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Right	Left	Left	Left	Right		
Median Width(ft)	26			0	0			
Link Offset(ft)	0			0	0			
Crosswalk Width(ft)	16			16	16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	30	9	15			9		
Number of Detectors	1			2				
Detector Template	Left			Thru				
Leading Detector (ft)	20			100				
Trailing Detector (ft)	0			0				
Detector 1 Position(ft)	0			0				
Detector 1 Size(ft)	20			6				
Detector 1 Type	Cl+Ex			Cl+Ex				
Detector 1 Channel								
Detector 1 Extend (s)	0.0			0.0				
Detector 1 Queue (s)	0.0			0.0				
Detector 1 Delay (s)	0.0			0.0				
Detector 2 Position(ft)				94				
Detector 2 Size(ft)				6				
Detector 2 Type				Cl+Ex				
Detector 2 Channel								
Detector 2 Extend (s)				0.0				
Turn Type	Prot			NA				
Protected Phases	3			2 4		2	4	
Permitted Phases								
Detector Phase	3			2 4				

Lanes, Volumes, Timings  
14: Alewife Brook Parkway & Route 2

2020 Baseline Weekday Morning Peak Hour

01/14/2021



Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Switch Phase								
Minimum Initial (s)	10.0						10.0	10.0
Minimum Split (s)	19.0						15.0	15.0
Total Split (s)	36.0						58.0	26.0
Total Split (%)	30.0%						48%	22%
Maximum Green (s)	30.0						53.0	21.0
Yellow Time (s)	4.0						4.0	3.5
All-Red Time (s)	2.0						1.0	1.5
Lost Time Adjust (s)	0.0							
Total Lost Time (s)	6.0							
Lead/Lag	Lead						Lag	
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0						3.0	3.0
Recall Mode	Max						C-Max	Max
Walk Time (s)	5.0							
Flash Dont Walk (s)	8.0							
Pedestrian Calls (#/hr)	0							
Act Effect Green (s)	30.0				79.0			
Actuated g/C Ratio	0.25				0.66			
v/c Ratio	0.59				0.50			
Control Delay	2.3				11.4			
Queue Delay	0.9				0.0			
Total Delay	3.2				11.4			
LOS	A				B			
Approach Delay	3.2				11.4			
Approach LOS	A				B			

Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 8.6

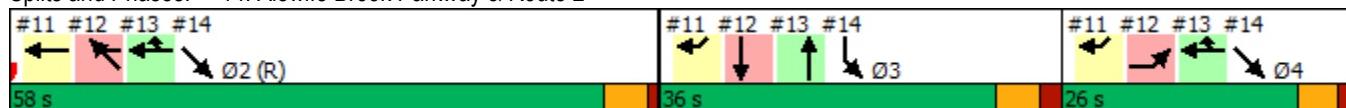
Intersection LOS: A

Intersection Capacity Utilization 57.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 14: Alewife Brook Parkway & Route 2



Queues  
14: Alewife Brook Parkway & Route 2

2020 Baseline Weekday Morning Peak Hour

01/14/2021



Lane Group	SBL	SET
Lane Group Flow (vph)	575	1097
v/c Ratio	0.59	0.50
Control Delay	2.3	11.4
Queue Delay	0.9	0.0
Total Delay	3.2	11.4
Queue Length 50th (ft)	5	209
Queue Length 95th (ft)	0	258
Internal Link Dist (ft)	75	217
Turn Bay Length (ft)		
Base Capacity (vph)	973	2188
Starvation Cap Reductn	168	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.71	0.50

Intersection Summary

## Lanes, Volumes, Timings

2020 Baseline Weekday Morning Peak Hour

## 36: Minuteman Commuter Bikeway &amp; Lake Street

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	578	0	0	1096	0	0	0	0	0	0	0
Future Volume (vph)	0	578	0	0	1096	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	16	16	16	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	2049	0	0	2153	0	0	0	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	2049	0	0	2153	0	0	0	0	0	0	0
Right Turn on Red				Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		135			215			175			206	
Travel Time (s)		3.1			4.9			4.0			4.7	
Peak Hour Factor	0.84	0.84	0.84	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	688	0	0	1130	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	688	0	0	1130	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.85	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2			2							
Detector Template		Thru			Thru							
Leading Detector (ft)		100			100							
Trailing Detector (ft)		0			0							
Detector 1 Position(ft)		0			0							
Detector 1 Size(ft)		6			6							
Detector 1 Type		Cl+Ex			Cl+Ex							
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0							
Detector 1 Queue (s)		0.0			0.0							
Detector 1 Delay (s)		0.0			0.0							
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA			NA							
Protected Phases		2			6							
Permitted Phases												
Detector Phase		2			6							

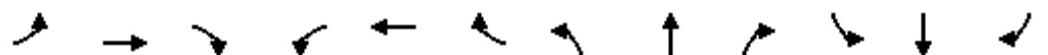
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

## Lanes, Volumes, Timings

36: Minuteman Commuter Bikeway &amp; Lake Street

2020 Baseline Weekday Morning Peak Hour

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Switch Phase</b>												
Minimum Initial (s)		4.0			4.0							
Minimum Split (s)		20.5			20.5							
Total Split (s)		47.0			47.0							
Total Split (%)		67.1%			67.1%							
Maximum Green (s)		42.5			42.5							
Yellow Time (s)		3.5			3.5							
All-Red Time (s)		1.0			1.0							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		4.5			4.5							
<b>Lead/Lag</b>												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0							
Recall Mode		C-Max			C-Max							
Walk Time (s)												
Flash Dont Walk (s)												
<b>Pedestrian Calls (#/hr)</b>												
Act Effect Green (s)		47.5			47.5							
Actuated g/C Ratio		0.68			0.68							
v/c Ratio		0.49			0.77							
Control Delay		6.9			17.0							
Queue Delay		37.8			51.3							
Total Delay		44.8			68.2							
LOS		D			E							
Approach Delay		44.8			68.2							
Approach LOS		D			E							

**Intersection Summary**

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 59.3

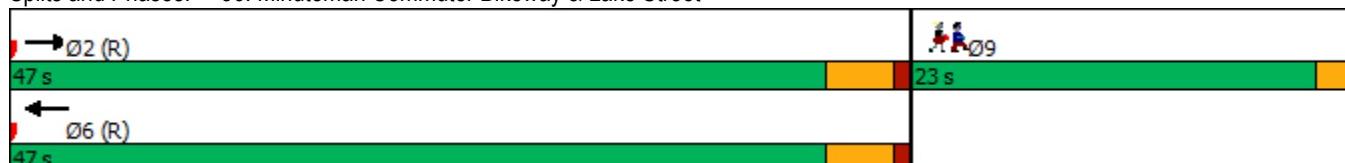
Intersection LOS: E

Intersection Capacity Utilization 61.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 36: Minuteman Commuter Bikeway &amp; Lake Street



Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	18.0
Total Split (s)	23.0
Total Split (%)	33%
Maximum Green (s)	21.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	304
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	



Lane Group	EBT	WBT
Lane Group Flow (vph)	688	1130
v/c Ratio	0.49	0.77
Control Delay	6.9	17.0
Queue Delay	37.8	51.3
Total Delay	44.8	68.2
Queue Length 50th (ft)	119	535
Queue Length 95th (ft)	162	m591
Internal Link Dist (ft)	55	135
Turn Bay Length (ft)		
Base Capacity (vph)	1390	1460
Starvation Cap Reductn	0	783
Spillback Cap Reductn	742	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.06	1.67

**Intersection Summary**

m Volume for 95th percentile queue is metered by upstream signal.

Lanes, Volumes, Timings  
39: Brooks Avenue & Lake Street

2020 Baseline Weekday Morning Peak Hour

01/14/2021

	→	→	→	←	←	↑	↑	↑	↓	↓	←	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	520	28	4	957	0	22	4	3	3	7	117
Future Volume (vph)	30	520	28	4	957	0	22	4	3	3	7	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	13	13	13	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993						0.986			0.876	
Flt Protected		0.997						0.963			0.999	
Satd. Flow (prot)	0	1984	0	0	1944	0	0	1804	0	0	1663	0
Flt Permitted		0.918			0.998			0.464			0.992	
Satd. Flow (perm)	0	1827	0	0	1940	0	0	869	0	0	1651	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		4					4				150	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		215			1126			206			208	
Travel Time (s)		4.9			25.6			4.7			4.7	
Peak Hour Factor	0.91	0.91	0.91	0.87	0.87	0.87	0.75	0.75	0.75	0.78	0.78	0.78
Heavy Vehicles (%)	0%	1%	5%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	33	571	31	5	1100	0	29	5	4	4	9	150
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	635	0	0	1105	0	0	38	0	0	163	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.92	0.92	0.92	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru										
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex										
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		3	8		4	4	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

Lanes, Volumes, Timings  
39: Brooks Avenue & Lake Street

2020 Baseline Weekday Morning Peak Hour  
01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.0	21.0		21.0	21.0		9.0	21.0		13.0	13.0	
Total Split (s)	27.0	27.0		27.0	27.0		10.0	23.0		13.0	13.0	
Total Split (%)	38.6%	38.6%		38.6%	38.6%		14.3%	32.9%		18.6%	18.6%	
Maximum Green (s)	22.5	22.5		22.5	22.5		5.5	18.5		8.5	8.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0			0.0			0.0			0.0		
Total Lost Time (s)	4.5			4.5			4.5			4.5		
Lead/Lag							Lead			Lag		Lag
Lead-Lag Optimize?							Yes			Yes		Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effect Green (s)	42.6			42.6			7.6			7.6		
Actuated g/C Ratio	0.61			0.61			0.11			0.11		
v/c Ratio	0.57			0.94			0.39			0.52		
Control Delay	19.6			34.8			37.7			13.0		
Queue Delay	16.1			47.0			0.0			0.6		
Total Delay	35.6			81.8			37.7			13.6		
LOS	D			F			D			B		
Approach Delay	35.6			81.8			37.7			13.6		
Approach LOS	D			F			D			B		

#### Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 60.1

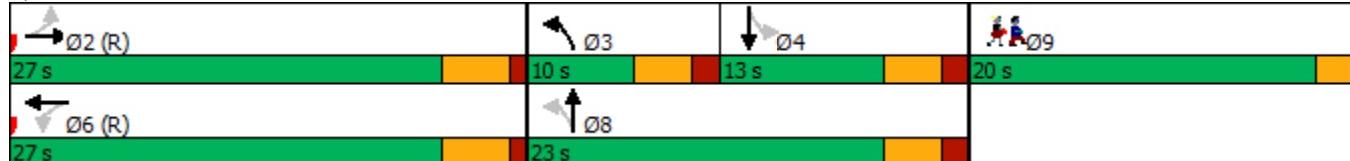
Intersection LOS: E

Intersection Capacity Utilization 73.4%

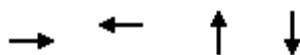
ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 39: Brooks Avenue & Lake Street



Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	29%
Maximum Green (s)	18.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	50
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	635	1105	38	163
v/c Ratio	0.57	0.94	0.39	0.52
Control Delay	19.6	34.8	37.7	13.0
Queue Delay	16.1	47.0	0.0	0.6
Total Delay	35.6	81.8	37.7	13.6
Queue Length 50th (ft)	224	~557	14	5
Queue Length 95th (ft)	#326	#790	32	37
Internal Link Dist (ft)	135	1046	126	128
Turn Bay Length (ft)				
Base Capacity (vph)	1113	1180	232	344
Starvation Cap Reductn	470	0	0	0
Spillback Cap Reductn	0	517	1	39
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.99	1.67	0.16	0.53

#### Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

2020 Baseline Weekday Evening Peak Hour

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↑	↔		
Traffic Vol, veh/h	786	3	1	573	9	4
Future Vol, veh/h	786	3	1	573	9	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	94	94	75	75
Heavy Vehicles, %	0	0	0	0	29	0
Mvmt Flow	947	4	1	610	12	5
Major/Minor						
Major1		Major2		Minor1		
Conflicting Flow All	0	0	951	0	1561	949
Stage 1	-	-	-	-	949	-
Stage 2	-	-	-	-	612	-
Critical Hdwy	-	-	4.1	-	6.69	6.2
Critical Hdwy Stg 1	-	-	-	-	5.69	-
Critical Hdwy Stg 2	-	-	-	-	5.69	-
Follow-up Hdwy	-	-	2.2	-	3.761	3.3
Pot Cap-1 Maneuver	-	-	730	-	107	319
Stage 1	-	-	-	-	337	-
Stage 2	-	-	-	-	492	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	730	-	107	319
Mov Cap-2 Maneuver	-	-	-	-	107	-
Stage 1	-	-	-	-	337	-
Stage 2	-	-	-	-	491	-
Approach						
EB		WB		NB		
HCM Control Delay, s	0		0	35.6		
HCM LOS				E		
Minor Lane/Major Mvmt						
NBLn1		EBT	EBR	WBL	WBT	
Capacity (veh/h)	135	-	-	730	-	
HCM Lane V/C Ratio	0.128	-	-	0.001	-	
HCM Control Delay (s)	35.6	-	-	9.9	0	
HCM Lane LOS	E	-	-	A	A	
HCM 95th %tile Q(veh)	0.4	-	-	0	-	

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	784	6	9	559	15	5
Future Vol, veh/h	784	6	9	559	15	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	89	89	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	901	7	10	628	20	7
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	908	0	1553	905
Stage 1	-	-	-	-	905	-
Stage 2	-	-	-	-	648	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	758	-	126	338
Stage 1	-	-	-	-	398	-
Stage 2	-	-	-	-	524	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	758	-	123	338
Mov Cap-2 Maneuver	-	-	-	-	123	-
Stage 1	-	-	-	-	398	-
Stage 2	-	-	-	-	514	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0.2		35.1		
HCM LOS		E				
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	146	-	-	758	-	
HCM Lane V/C Ratio	0.183	-	-	0.013	-	
HCM Control Delay (s)	35.1	-	-	9.8	0	
HCM Lane LOS	E	-	-	A	A	
HCM 95th %tile Q(veh)	0.6	-	-	0	-	

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	788	1	1	562	6	4
Future Vol, veh/h	788	1	1	562	6	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	89	89	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	906	1	1	631	8	5
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	907	0	1540	907
Stage 1	-	-	-	-	907	-
Stage 2	-	-	-	-	633	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	759	-	128	337
Stage 1	-	-	-	-	397	-
Stage 2	-	-	-	-	533	-
Platoon blocked, %	-	-	-	-		
Mov Cap-1 Maneuver	-	-	759	-	128	337
Mov Cap-2 Maneuver	-	-	-	-	128	-
Stage 1	-	-	-	-	397	-
Stage 2	-	-	-	-	532	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	28			
HCM LOS			D			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	170	-	-	759	-	
HCM Lane V/C Ratio	0.078	-	-	0.001	-	
HCM Control Delay (s)	28	-	-	9.8	0	
HCM Lane LOS	D	-	-	A	A	
HCM 95th %tile Q(veh)	0.3	-	-	0	-	

## Intersection

Int Delay, s/veh

1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Lane Configurations</b>												
Traffic Vol, veh/h	4	769	19	11	549	8	13	1	6	3	0	1
Future Vol, veh/h	4	769	19	11	549	8	13	1	6	3	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	894	22	13	638	9	17	1	8	4	0	1

Major/Minor	Major1	Major2		Minor1		Minor2		
Conflicting Flow All	647	0	0	916	0	0	1584	1588
Stage 1	-	-	-	-	-	-	915	915
Stage 2	-	-	-	-	-	-	669	673
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4
Pot Cap-1 Maneuver	948	-	-	753	-	-	89	109
Stage 1	-	-	-	-	-	-	329	354
Stage 2	-	-	-	-	-	-	450	457
Platoon blocked, %	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	948	-	-	753	-	-	86	105
Mov Cap-2 Maneuver	-	-	-	-	-	-	86	105
Stage 1	-	-	-	-	-	-	325	350
Stage 2	-	-	-	-	-	-	437	445

Approach	EB	WB		NB		SB		
HCM Control Delay, s	0	0.2		46.9		41.1		
HCM LOS				E		E		
<hr/>								
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	112	948	-	-	753	-	-	105
HCM Lane V/C Ratio	0.238	0.005	-	-	0.017	-	-	0.051
HCM Control Delay (s)	46.9	8.8	0	-	9.9	0	-	41.1
HCM Lane LOS	E	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	0.9	0	-	-	0.1	-	-	0.2

## Intersection

Int Delay, s/veh 6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Lane Configurations</b>												
Traffic Vol, veh/h	18	756	4	60	548	15	9	0	43	9	0	11
Future Vol, veh/h	18	756	4	60	548	15	9	0	43	9	0	11
Conflicting Peds, #/hr	0	0	0	304	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	88	88	88	81	81	81	80	80	80
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	22	911	5	68	623	17	11	0	53	11	0	14

Major/Minor	Major1	Major2			Minor1			Minor2				
Conflicting Flow All	640	0	0	1220	0	0	2037	2038	1218	1752	2032	632
Stage 1	-	-	-	-	-	-	1262	1262	-	768	768	-
Stage 2	-	-	-	-	-	-	775	776	-	984	1264	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	954	-	-	579	-	-	43	57	222	68	58	484
Stage 1	-	-	-	-	-	-	210	243	-	397	414	-
Stage 2	-	-	-	-	-	-	394	410	-	302	243	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	954	-	-	432	-	-	24	31	166	36	31	484
Mov Cap-2 Maneuver	-	-	-	-	-	-	24	31	-	36	31	-
Stage 1	-	-	-	-	-	-	150	173	-	378	313	-
Stage 2	-	-	-	-	-	-	289	310	-	196	173	-

Approach	EB	WB			NB			SB			
HCM Control Delay, s	0.2	1.4			133.7			78.1			
HCM LOS					F			F			
<hr/>											
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)	82	954	-	-	432	-	-	73			
HCM Lane V/C Ratio	0.783	0.023	-	-	0.158	-	-	0.342			
HCM Control Delay (s)	133.7	8.9	0	-	14.9	0	-	78.1			
HCM Lane LOS	F	A	A	-	B	A	-	F			
HCM 95th %tile Q(veh)	3.9	0.1	-	-	0.6	-	-	1.3			



Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Lane Configurations	↑ ↗	↑ ↗	↑ ↘ ↖	↑ ↗	↑ ↗	↑ ↗	
Traffic Volume (vph)	407	261	635	181	335	714	
Future Volume (vph)	407	261	635	181	335	714	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	11	10	11	12	
Storage Length (ft)	0	100		55	150		
Storage Lanes	1	1		1	1		
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00	
Fr <sub>t</sub>		0.850		0.850			
Flt Protected	0.950				0.950		
Satd. Flow (prot)	2046	1830	3421	1507	1745	1863	
Flt Permitted	0.950				0.233		
Satd. Flow (perm)	2046	1830	3421	1507	428	1863	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		139		84			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1126		640			645	
Travel Time (s)	25.6		14.5			14.7	
Peak Hour Factor	0.88	0.88	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%	
Adj. Flow (vph)	463	297	690	197	364	776	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	463	297	690	197	364	776	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	16		11			11	
Link Offset(ft)	0		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.04	1.09	1.04	1.00	
Turning Speed (mph)	15	9		9	15		
Number of Detectors	1	1	2	1	1	2	
Detector Template	Left	Right	Thru	Right	Left	Thru	
Leading Detector (ft)	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	
Detector 1 Size(ft)	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)			94		94		
Detector 2 Size(ft)			6		6		
Detector 2 Type			Cl+Ex		Cl+Ex		
Detector 2 Channel							
Detector 2 Extend (s)			0.0		0.0		
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA	



Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Protected Phases	4		6		5	2	9
Permitted Phases			4		6	2	
Detector Phase	4	4	6	6	5	2	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0	23.0	23.0	23.0	10.0	23.0	19.0
Total Split (s)	29.0	29.0	38.0	38.0	15.0	53.0	23.0
Total Split (%)	27.6%	27.6%	36.2%	36.2%	14.3%	50.5%	22%
Maximum Green (s)	22.0	22.0	31.0	31.0	9.0	46.0	20.0
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	2.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.0	7.0	
Lead/Lag			Lag	Lag	Lead		
Lead-Lag Optimize?			Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max	None
Walk Time (s)							5.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							35
Act Effct Green (s)	22.2	22.2	31.3	31.3	47.5	46.5	
Actuated g/C Ratio	0.24	0.24	0.34	0.34	0.51	0.50	
v/c Ratio	0.95	0.55	0.60	0.35	1.06	0.84	
Control Delay	68.7	21.9	30.0	16.8	86.8	32.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	68.7	21.9	30.0	16.8	86.8	32.4	
LOS	E	C	C	B	F	C	
Approach Delay	50.4		27.0			49.8	
Approach LOS	D		C			D	

## Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 93.4

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 42.7

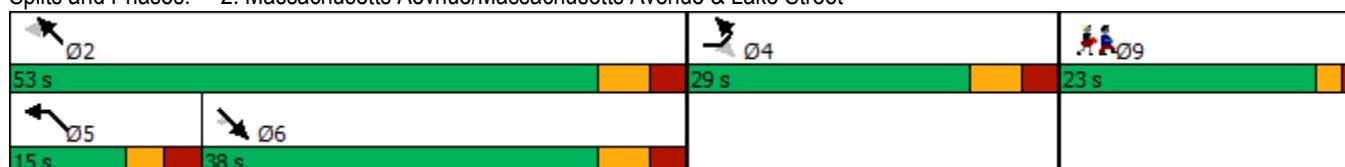
Intersection LOS: D

Intersection Capacity Utilization 75.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Massachusetts Avenue/Massachusetts Avenue &amp; Lake Street



## Queues

2020 Baseline Weekday Evening Peak Hour

## 2: Massachusetts Avenue/Massachusetts Avenue &amp; Lake Street

01/14/2021



Lane Group	EBL	EBR	SET	SER	NWL	NWT
Lane Group Flow (vph)	463	297	690	197	364	776
v/c Ratio	0.95	0.55	0.60	0.35	1.06	0.84
Control Delay	68.7	21.9	30.0	16.8	86.8	32.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.7	21.9	30.0	16.8	86.8	32.4
Queue Length 50th (ft)	~324	89	202	54	~191	453
Queue Length 95th (ft)	#499	170	265	117	#388	#702
Internal Link Dist (ft)	1046		560			565
Turn Bay Length (ft)		100		55	150	
Base Capacity (vph)	486	541	1147	560	345	927
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.55	0.60	0.35	1.06	0.84

## Intersection Summary

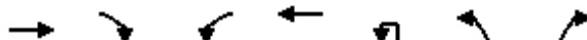
- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

## Lanes, Volumes, Timings

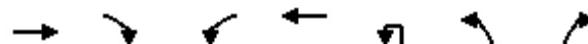
2020 Baseline Weekday Evening Peak Hour

## 5: Route 2 EB On/Off Ramps &amp; Lake Street

01/14/2021



Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑	↖	↗	↑
Traffic Volume (vph)	521	171	159	286	14	488	571
Future Volume (vph)	521	171	159	286	14	488	571
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	10	11	12	16	14
Storage Length (ft)		150	110		0	0	
Storage Lanes		1	1		1	1	
Taper Length (ft)			25		25		
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Fr <sub>t</sub>		0.850				0.850	
Flt Protected			0.950			0.950	
Satd. Flow (prot)	2153	1664	1652	3490	0	2046	1723
Flt Permitted			0.950			0.950	
Satd. Flow (perm)	2153	1664	1652	3490	0	2046	1723
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		69				433	
Link Speed (mph)	30			30		30	
Link Distance (ft)	239			505		387	
Travel Time (s)	5.4			11.5		8.8	
Peak Hour Factor	0.94	0.94	0.87	0.87	0.96	0.96	0.96
Heavy Vehicles (%)	0%	10%	2%	0%	0%	0%	0%
Adj. Flow (vph)	554	182	183	329	15	508	595
Shared Lane Traffic (%)							
Lane Group Flow (vph)	554	182	183	329	0	523	595
Enter Blocked Intersection	No						
Lane Alignment	Left	Right	Left	Left	R NA	Left	Right
Median Width(ft)	12			12		16	
Link Offset(ft)	0			0		0	
Crosswalk Width(ft)	16			16		16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.09	1.04	1.00	0.85	0.92
Turning Speed (mph)		9	15		9	15	9
Number of Detectors	2	1	1	2	1	1	1
Detector Template	Thru	Right	Left	Thru	Left	Left	Right
Leading Detector (ft)	100	20	20	100	20	20	20
Trailing Detector (ft)	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20	20
Detector 1 Type	Cl+Ex						
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94		94				
Detector 2 Size(ft)	6		6				
Detector 2 Type	Cl+Ex		Cl+Ex				
Detector 2 Channel							
Detector 2 Extend (s)	0.0		0.0				
Turn Type	NA	Free	Prot	NA	Perm	Prot	Perm



Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Protected Phases	4		3	8		2	
Permitted Phases		Free			2		2
Detector Phase	4		3	8	2	2	2
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0		9.0	21.0	21.0	21.0	21.0
Total Split (s)	74.0		25.0	99.0	21.0	21.0	21.0
Total Split (%)	61.7%		20.8%	82.5%	17.5%	17.5%	17.5%
Maximum Green (s)	69.0		20.0	94.0	16.0	16.0	16.0
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max	Max
Walk Time (s)	5.0			5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0	0
Act Effct Green (s)	24.1	68.8	13.0	42.2		16.3	16.3
Actuated g/C Ratio	0.35	1.00	0.19	0.61		0.24	0.24
v/c Ratio	0.73	0.11	0.59	0.15		1.08	0.81
Control Delay	26.1	0.1	35.0	5.4		93.9	18.6
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	26.1	0.1	35.0	5.4		93.9	18.6
LOS	C	A	C	A		F	B
Approach Delay	19.7			16.0		53.8	
Approach LOS	B			B		D	

## Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 68.8

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 35.0

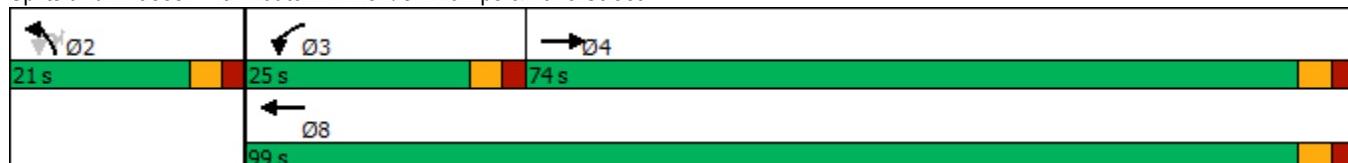
Intersection LOS: D

Intersection Capacity Utilization 76.5%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 5: Route 2 EB On/Off Ramps &amp; Lake Street



## Queues

2020 Baseline Weekday Evening Peak Hour

## 5: Route 2 EB On/Off Ramps &amp; Lake Street

01/14/2021



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	554	182	183	329	523	595
v/c Ratio	0.73	0.11	0.59	0.15	1.08	0.81
Control Delay	26.1	0.1	35.0	5.4	93.9	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	0.1	35.0	5.4	93.9	18.6
Queue Length 50th (ft)	196	0	71	26	~253	57
Queue Length 95th (ft)	337	0	142	38	#558	#280
Internal Link Dist (ft)	159			425	307	
Turn Bay Length (ft)		150	110			
Base Capacity (vph)	2043	1664	490	3490	486	739
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.11	0.37	0.09	1.08	0.81

## Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

## Lanes, Volumes, Timings

## 7: Route 2 WB Off Ramp &amp; Lake Street

2020 Baseline Weekday Evening Peak Hour

01/14/2021



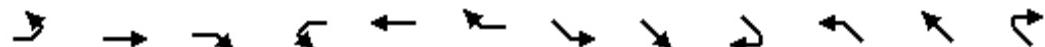
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	327	765	0	0	248	334	0	0	0	197	21	24
Future Volume (vph)	327	765	0	0	248	334	0	0	0	197	21	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	10	12	12	12	11	12	16
Storage Length (ft)	250			0	0	75	0		0	100		0
Storage Lanes	1			0	0	1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Fr <sub>t</sub>						0.850						0.850
Flt Protected	0.950									0.950	0.961	
Satd. Flow (prot)	1805	1881	0	0	1801	1463	0	0	0	1641	1705	1830
Flt Permitted	0.950									0.950	0.961	
Satd. Flow (perm)	1805	1881	0	0	1801	1463	0	0	0	1641	1705	1830
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						367						136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			380			459			529	
Travel Time (s)		11.5			8.6			10.4			12.0	
Peak Hour Factor	0.88	0.88	0.88	0.91	0.91	0.91	0.92	0.92	0.92	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	0%	0%	2%	3%	0%	0%	0%	1%	5%	0%
Adj. Flow (vph)	372	869	0	0	273	367	0	0	0	207	22	25
Shared Lane Traffic (%)										45%		
Lane Group Flow (vph)	372	869	0	0	273	367	0	0	0	114	115	25
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.04	1.09	1.00	1.00	1.00	1.04	1.00	0.85
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2	1				1	2	1
Detector Template	Left	Thru			Thru	Right				Left	Thru	Right
Leading Detector (ft)	20	100			100	20				20	100	20
Trailing Detector (ft)	0	0			0	0				0	0	0
Detector 1 Position(ft)	0	0			0	0				0	0	0
Detector 1 Size(ft)	20	6			6	20				20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex				Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Prot	NA			NA	Perm				Split	NA	Perm

## Lanes, Volumes, Timings

## 7: Route 2 WB Off Ramp &amp; Lake Street

2020 Baseline Weekday Evening Peak Hour

01/14/2021



Lane Group	EBL	EBT	EBC	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Protected Phases	7	4			8					2	2	
Permitted Phases						8						2
Detector Phase	7	4			8	8				2	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Minimum Split (s)	8.5	22.0			22.0	22.0				22.0	22.0	22.0
Total Split (s)	16.0	38.0			22.0	22.0				22.0	22.0	22.0
Total Split (%)	26.7%	63.3%			36.7%	36.7%				36.7%	36.7%	36.7%
Maximum Green (s)	11.5	32.0			16.0	16.0				16.0	16.0	16.0
Yellow Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
All-Red Time (s)	0.5	2.0			2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0			6.0	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Recall Mode	None	None			None	None				Max	Max	Max
Walk Time (s)		5.0			5.0	5.0				5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0	11.0				11.0	11.0	11.0
Pedestrian Calls (#/hr)	0				0	0				0	0	0
Act Effct Green (s)	11.5	30.0			14.0	14.0				16.0	16.0	16.0
Actuated g/C Ratio	0.20	0.52			0.24	0.24				0.28	0.28	0.28
v/c Ratio	1.04	0.89			0.63	0.58				0.25	0.24	0.04
Control Delay	87.6	26.7			26.7	6.7				19.1	19.0	0.1
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	87.6	26.7			26.7	6.7				19.1	19.0	0.1
LOS	F	C			C	A				B	B	A
Approach Delay		45.0			15.2						17.2	
Approach LOS		D			B						B	

## Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 58.1

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 32.7

Intersection LOS: C

Intersection Capacity Utilization 58.6%

ICU Level of Service B

Analysis Period (min) 15

## Splits and Phases: 7: Route 2 WB Off Ramp &amp; Lake Street



## Queues

2020 Baseline Weekday Evening Peak Hour

## 7: Route 2 WB Off Ramp &amp; Lake Street

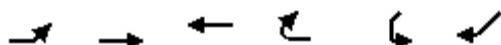
01/14/2021



Lane Group	EBL	EBT	WBT	WBR	NWL	NWT	NWR
Lane Group Flow (vph)	372	869	273	367	114	115	25
V/c Ratio	1.04	0.89	0.63	0.58	0.25	0.24	0.04
Control Delay	87.6	26.7	26.7	6.7	19.1	19.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.6	26.7	26.7	6.7	19.1	19.0	0.1
Queue Length 50th (ft)	~155	247	85	0	33	34	0
Queue Length 95th (ft)	#289	#463	152	55	72	72	0
Internal Link Dist (ft)			425	300		449	
Turn Bay Length (ft)	250			75	100		
Base Capacity (vph)	357	1038	497	669	453	470	603
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.04	0.84	0.55	0.55	0.25	0.24	0.04

## Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Lane Configurations			↑↑			↑↑		
Traffic Volume (vph)	0	0	2131	0	0	1091		
Future Volume (vph)	0	0	2131	0	0	1091		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.88		
Frt						0.850		
Flt Protected								
Satd. Flow (prot)	0	0	4776	0	0	2617		
Flt Permitted								
Satd. Flow (perm)	0	0	4776	0	0	2617		
Right Turn on Red				Yes		Yes		
Satd. Flow (RTOR)						2		
Link Speed (mph)		30	30		30			
Link Distance (ft)		201	192		296			
Travel Time (s)		4.6	4.4		6.7			
Peak Hour Factor	0.92	0.92	0.97	0.97	0.98	0.98		
Heavy Vehicles (%)	2%	2%	1%	0%	0%	1%		
Adj. Flow (vph)	0	0	2197	0	0	1113		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	2197	0	0	1113		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		0	0		0			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	15			9	15	30		
Number of Detectors		2			1			
Detector Template		Thru		Right				
Leading Detector (ft)		100		20				
Trailing Detector (ft)		0		0				
Detector 1 Position(ft)		0		0				
Detector 1 Size(ft)		6		20				
Detector 1 Type		Cl+Ex		Cl+Ex				
Detector 1 Channel								
Detector 1 Extend (s)		0.0		0.0				
Detector 1 Queue (s)		0.0		0.0				
Detector 1 Delay (s)		0.0		0.0				
Detector 2 Position(ft)		94						
Detector 2 Size(ft)		6						
Detector 2 Type		Cl+Ex						
Detector 2 Channel								
Detector 2 Extend (s)		0.0						
Turn Type		NA		custom				
Protected Phases		2		3 4	3	4		
Permitted Phases								
Detector Phase		2		3 4				

## Lanes, Volumes, Timings

11: Route 2/Alewife Brook Parkway &amp; Route 16

2020 Baseline Weekday Evening Peak Hour

01/14/2021



Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
<b>Switch Phase</b>								
Minimum Initial (s)			10.0				10.0	10.0
Minimum Split (s)			15.0				19.0	15.0
Total Split (s)			58.0				36.0	26.0
Total Split (%)			48.3%				30%	22%
Maximum Green (s)			53.0				30.0	21.0
Yellow Time (s)			4.0				4.0	3.5
All-Red Time (s)			1.0				2.0	1.5
Lost Time Adjust (s)			0.0					
Total Lost Time (s)			5.0					
<b>Lead/Lag</b>							Lead	Lag
<b>Lead-Lag Optimize?</b>								
Vehicle Extension (s)			3.0				3.0	3.0
Recall Mode			C-Max				Max	Max
Walk Time (s)							5.0	
Flash Dont Walk (s)							8.0	
Pedestrian Calls (#/hr)							0	
Act Effect Green (s)			53.0				56.0	
Actuated g/C Ratio			0.44				0.47	
v/c Ratio			1.04				0.91	
Control Delay			29.4				41.9	
Queue Delay			1.5				0.0	
Total Delay			30.9				41.9	
LOS			C				D	
Approach Delay			30.9			41.9		
Approach LOS			C			D		

**Intersection Summary**

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 34.6

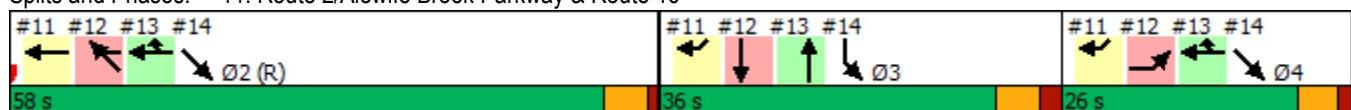
Intersection LOS: C

Intersection Capacity Utilization 97.3%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 11: Route 2/Alewife Brook Parkway &amp; Route 16





Lane Group	WBT	SWR
Lane Group Flow (vph)	2197	1113
v/c Ratio	1.04	0.91
Control Delay	29.4	41.9
Queue Delay	1.5	0.0
Total Delay	30.9	41.9
Queue Length 50th (ft)	~656	442
Queue Length 95th (ft)	m52	#606
Internal Link Dist (ft)	112	
Turn Bay Length (ft)		
Base Capacity (vph)	2109	1222
Starvation Cap Reductn	8	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.05	0.91

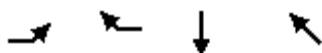
**Intersection Summary**

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Lanes, Volumes, Timings  
12: Alewife Brook Parkway & Route 2

2020 Baseline Weekday Evening Peak Hour

01/14/2021

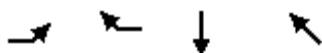


Lane Group	EBL	WBR	SBT	NWT
Lane Configurations	↑↑	↑	↑↑	↑↑
Traffic Volume (vph)	581	571	241	1560
Future Volume (vph)	581	571	241	1560
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	13	16	13	13
Lane Util. Factor	0.97	1.00	0.95	0.95
Frt	0.865			
Flt Protected	0.950			
Satd. Flow (prot)	3257	1660	3291	3324
Flt Permitted	0.950			
Satd. Flow (perm)	3257	1660	3291	3324
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)		30	30	
Link Distance (ft)		202	278	
Travel Time (s)		4.6	6.3	
Peak Hour Factor	0.90	0.95	0.98	0.97
Heavy Vehicles (%)	0%	1%	2%	1%
Adj. Flow (vph)	646	601	246	1608
Shared Lane Traffic (%)				
Lane Group Flow (vph)	646	601	246	1608
Enter Blocked Intersection	No	No	No	No
Lane Alignment	Left	R NA	Left	L NA
Median Width(ft)		0	0	
Link Offset(ft)		0	0	
Crosswalk Width(ft)		16	16	
Two way Left Turn Lane				
Headway Factor	1.10	0.97	1.10	1.10
Turning Speed (mph)	15	30		
Number of Detectors	1	1	2	2
Detector Template	Left	Right	Thru	Thru
Leading Detector (ft)	20	20	100	100
Trailing Detector (ft)	0	0	0	0
Detector 1 Position(ft)	0	0	0	0
Detector 1 Size(ft)	20	20	6	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel				
Detector 1 Extend (s)	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94	94	
Detector 2 Size(ft)		6	6	
Detector 2 Type		Cl+Ex	Cl+Ex	
Detector 2 Channel				
Detector 2 Extend (s)		0.0	0.0	
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	2!	3	2!
Permitted Phases				
Detector Phase	4	2	3	2

Lanes, Volumes, Timings  
12: Alewife Brook Parkway & Route 2

2020 Baseline Weekday Evening Peak Hour

01/14/2021



Lane Group	EBL	WBR	SBT	NWT
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.0	15.0	19.0	15.0
Total Split (s)	26.0	58.0	36.0	58.0
Total Split (%)	21.7%	48.3%	30.0%	48.3%
Maximum Green (s)	21.0	53.0	30.0	53.0
Yellow Time (s)	3.5	4.0	4.0	4.0
All-Red Time (s)	1.5	1.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.0	5.0
Lead/Lag	Lag	Lead		
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	C-Max	Max	C-Max
Walk Time (s)			5.0	
Flash Dont Walk (s)			8.0	
Pedestrian Calls (#/hr)			0	
Act Effect Green (s)	21.0	53.0	30.0	53.0
Actuated g/C Ratio	0.18	0.44	0.25	0.44
v/c Ratio	1.14	0.82	0.30	1.10
Control Delay	125.6	27.9	37.7	86.8
Queue Delay	0.0	1.3	0.0	2.1
Total Delay	125.6	29.2	37.7	89.0
LOS	F	C	D	F
Approach Delay			37.7	89.0
Approach LOS			D	F

#### Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 80.9

Intersection LOS: F

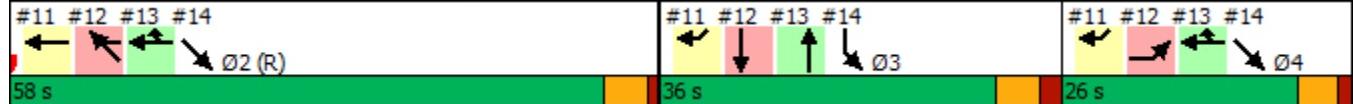
Intersection Capacity Utilization 130.6%

ICU Level of Service H

Analysis Period (min) 15

! Phase conflict between lane groups.

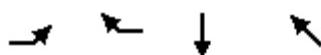
Splits and Phases: 12: Alewife Brook Parkway & Route 2



Queues  
12: Alewife Brook Parkway & Route 2

2020 Baseline Weekday Evening Peak Hour

01/14/2021



Lane Group	EBL	WBR	SBT	NWT
Lane Group Flow (vph)	646	601	246	1608
v/c Ratio	1.14	0.82	0.30	1.10
Control Delay	125.6	27.9	37.7	86.8
Queue Delay	0.0	1.3	0.0	2.1
Total Delay	125.6	29.2	37.7	89.0
Queue Length 50th (ft)	~300	399	81	~741
Queue Length 95th (ft)	#418	#578	119	#880
Internal Link Dist (ft)			122	198
Turn Bay Length (ft)				
Base Capacity (vph)	569	733	822	1468
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	36	0	73
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.14	0.86	0.30	1.15

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

## Lanes, Volumes, Timings

2020 Baseline Weekday Evening Peak Hour

13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑	↑		↑↑				
Traffic Volume (vph)	0	0	0	0	571	317	0	230	0	0	0	0
Future Volume (vph)	0	0	0	0	571	317	0	230	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		200	0		0	0	0	0
Storage Lanes	0		0	0		1	0		0	0	0	0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr <sub>t</sub>							0.850					
Flt Protected												
Satd. Flow (prot)	0	0	0	0	1693	1439	0	3217	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	1693	1439	0	3217	0	0	0	0
Right Turn on Red				No		No	No		No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		161			1225			227			185	
Travel Time (s)		3.7			27.8			5.2			4.2	
Confl. Peds. (#/hr)						2						
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.97	0.97	0.97	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	1%	1%	0%	1%	0%	2%	2%	2%
Adj. Flow (vph)	0	0	0	0	601	334	0	237	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	601	334	0	237	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors					2	1		2				
Detector Template						Thru	Right		Thru			
Leading Detector (ft)					100	20		100				
Trailing Detector (ft)					0	0		0				
Detector 1 Position(ft)					0	0		0				
Detector 1 Size(ft)					6	20		6				
Detector 1 Type					Cl+Ex	Cl+Ex		Cl+Ex				
Detector 1 Channel												
Detector 1 Extend (s)					0.0	0.0		0.0				
Detector 1 Queue (s)					0.0	0.0		0.0				
Detector 1 Delay (s)					0.0	0.0		0.0				
Detector 2 Position(ft)					94			94				
Detector 2 Size(ft)					6			6				
Detector 2 Type					Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				

Lane Group	Ø2	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		

## Lanes, Volumes, Timings

13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access

2020 Baseline Weekday Evening Peak Hour

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type					NA	Prot		NA				
Protected Phases					24	24			3			
Permitted Phases												
Detector Phase					24	24			3			
Switch Phase												
Minimum Initial (s)								10.0				
Minimum Split (s)								19.0				
Total Split (s)								36.0				
Total Split (%)								30.0%				
Maximum Green (s)								30.0				
Yellow Time (s)								4.0				
All-Red Time (s)								2.0				
Lost Time Adjust (s)								0.0				
Total Lost Time (s)								6.0				
Lead/Lag								Lead				
Lead-Lag Optimize?												
Vehicle Extension (s)								3.0				
Recall Mode								Max				
Walk Time (s)								5.0				
Flash Dont Walk (s)								8.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)				79.0	79.0			30.0				
Actuated g/C Ratio				0.66	0.66			0.25				
v/c Ratio				0.54	0.35			0.29				
Control Delay				13.1	10.4			37.7				
Queue Delay				1.7	0.0			0.0				
Total Delay				14.8	10.4			37.7				
LOS				B	B			D				
Approach Delay				13.2				37.7				
Approach LOS				B				D				

## Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 18.2

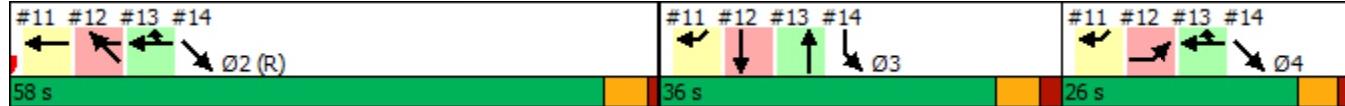
Intersection LOS: B

Intersection Capacity Utilization 50.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access



Lane Group	Ø2	Ø4
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	15.0	15.0
Total Split (s)	58.0	26.0
Total Split (%)	48%	22%
Maximum Green (s)	53.0	21.0
Yellow Time (s)	4.0	3.5
All-Red Time (s)	1.0	1.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	C-Max	Max
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
<b>Intersection Summary</b>		

## Queues

2020 Baseline Weekday Evening Peak Hour

13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access

01/14/2021



Lane Group	WBT	WBR	NBT
Lane Group Flow (vph)	601	334	237
v/c Ratio	0.54	0.35	0.29
Control Delay	13.1	10.4	37.7
Queue Delay	1.7	0.0	0.0
Total Delay	14.8	10.4	37.7
Queue Length 50th (ft)	227	106	78
Queue Length 95th (ft)	320	159	115
Internal Link Dist (ft)	1145		147
Turn Bay Length (ft)		200	
Base Capacity (vph)	1114	947	804
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	336	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.77	0.35	0.29

Intersection Summary

Lanes, Volumes, Timings  
14: Alewife Brook Parkway & Route 2

2020 Baseline Weekday Evening Peak Hour

01/14/2021



Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Lane Configurations	↑↑			↑↑				
Traffic Volume (vph)	241	0	0	952	0	0		
Future Volume (vph)	241	0	0	952	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	1.00		
Frt								
Flt Protected	0.950							
Satd. Flow (prot)	3193	0	0	3324	0	0		
Flt Permitted	0.950							
Satd. Flow (perm)	3193	0	0	3324	0	0		
Right Turn on Red	Yes	Yes			Yes			
Satd. Flow (RTOR)	254							
Link Speed (mph)	30			30	30			
Link Distance (ft)	155			297	139			
Travel Time (s)	3.5			6.8	3.2			
Peak Hour Factor	0.98	0.98	0.90	0.90	0.92	0.92		
Heavy Vehicles (%)	2%	0%	0%	1%	2%	2%		
Adj. Flow (vph)	246	0	0	1058	0	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	246	0	0	1058	0	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Right	Left	Left	Left	Right		
Median Width(ft)	26			0	0			
Link Offset(ft)	0			0	0			
Crosswalk Width(ft)	16			16	16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	30	9	15			9		
Number of Detectors	1			2				
Detector Template	Left			Thru				
Leading Detector (ft)	20			100				
Trailing Detector (ft)	0			0				
Detector 1 Position(ft)	0			0				
Detector 1 Size(ft)	20			6				
Detector 1 Type	Cl+Ex			Cl+Ex				
Detector 1 Channel								
Detector 1 Extend (s)	0.0			0.0				
Detector 1 Queue (s)	0.0			0.0				
Detector 1 Delay (s)	0.0			0.0				
Detector 2 Position(ft)				94				
Detector 2 Size(ft)				6				
Detector 2 Type				Cl+Ex				
Detector 2 Channel								
Detector 2 Extend (s)				0.0				
Turn Type	Prot			NA				
Protected Phases	3			2 4		2	4	
Permitted Phases								
Detector Phase	3			2 4				

Lanes, Volumes, Timings  
14: Alewife Brook Parkway & Route 2

2020 Baseline Weekday Evening Peak Hour

01/14/2021



Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Switch Phase								
Minimum Initial (s)	10.0						10.0	10.0
Minimum Split (s)	19.0						15.0	15.0
Total Split (s)	36.0						58.0	26.0
Total Split (%)	30.0%						48%	22%
Maximum Green (s)	30.0						53.0	21.0
Yellow Time (s)	4.0						4.0	3.5
All-Red Time (s)	2.0						1.0	1.5
Lost Time Adjust (s)	0.0							
Total Lost Time (s)	6.0							
Lead/Lag	Lead						Lag	
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0						3.0	3.0
Recall Mode	Max						C-Max	Max
Walk Time (s)	5.0							
Flash Dont Walk (s)	8.0							
Pedestrian Calls (#/hr)	0							
Act Effect Green (s)	30.0				79.0			
Actuated g/C Ratio	0.25				0.66			
v/c Ratio	0.25				0.48			
Control Delay	0.7				11.2			
Queue Delay	0.5				0.0			
Total Delay	1.3				11.2			
LOS	A				B			
Approach Delay	1.3				11.2			
Approach LOS	A				B			

Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 9.3

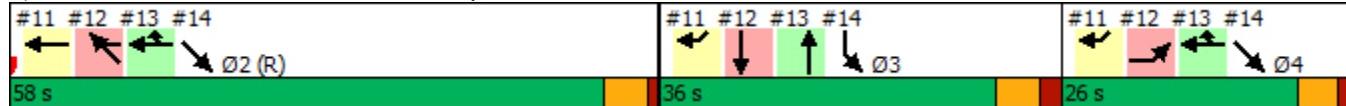
Intersection LOS: A

Intersection Capacity Utilization 46.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 14: Alewife Brook Parkway & Route 2



Queues  
14: Alewife Brook Parkway & Route 2

2020 Baseline Weekday Evening Peak Hour

01/14/2021



Lane Group	SBL	SET
Lane Group Flow (vph)	246	1058
v/c Ratio	0.25	0.48
Control Delay	0.7	11.2
Queue Delay	0.5	0.0
Total Delay	1.3	11.2
Queue Length 50th (ft)	0	198
Queue Length 95th (ft)	0	245
Internal Link Dist (ft)	75	217
Turn Bay Length (ft)		
Base Capacity (vph)	988	2188
Starvation Cap Reductn	419	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.43	0.48
Intersection Summary		

## Lanes, Volumes, Timings

2020 Baseline Weekday Evening Peak Hour

## 36: Minuteman Commuter Bikeway &amp; Lake Street

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	808	0	0	623	0	0	0	0	0	0	0
Future Volume (vph)	0	808	0	0	623	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	16	16	16	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	2049	0	0	2153	0	0	0	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	2049	0	0	2153	0	0	0	0	0	0	0
Right Turn on Red				Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		135			215			175			206	
Travel Time (s)		3.1			4.9			4.0			4.7	
Peak Hour Factor	0.84	0.84	0.84	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	962	0	0	642	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	962	0	0	642	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.85	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2			2							
Detector Template		Thru			Thru							
Leading Detector (ft)		100			100							
Trailing Detector (ft)		0			0							
Detector 1 Position(ft)		0			0							
Detector 1 Size(ft)		6			6							
Detector 1 Type		Cl+Ex			Cl+Ex							
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0							
Detector 1 Queue (s)		0.0			0.0							
Detector 1 Delay (s)		0.0			0.0							
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA			NA							
Protected Phases		2			6							
Permitted Phases												
Detector Phase		2			6							

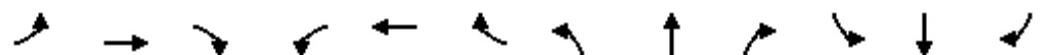
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

## Lanes, Volumes, Timings

36: Minuteman Commuter Bikeway &amp; Lake Street

2020 Baseline Weekday Evening Peak Hour

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Switch Phase</b>												
Minimum Initial (s)		4.0			4.0							
Minimum Split (s)		20.5			20.5							
Total Split (s)		47.0			47.0							
Total Split (%)		67.1%			67.1%							
Maximum Green (s)		42.5			42.5							
Yellow Time (s)		3.5			3.5							
All-Red Time (s)		1.0			1.0							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		4.5			4.5							
<b>Lead/Lag</b>												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0							
Recall Mode		C-Max			C-Max							
Walk Time (s)												
Flash Dont Walk (s)												
<b>Pedestrian Calls (#/hr)</b>												
Act Effect Green (s)		47.5			47.5							
Actuated g/C Ratio		0.68			0.68							
v/c Ratio		0.69			0.44							
Control Delay		10.2			6.8							
Queue Delay		50.7			1.6							
Total Delay		60.9			8.3							
LOS		E			A							
Approach Delay		60.9			8.3							
Approach LOS		E			A							

**Intersection Summary**

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

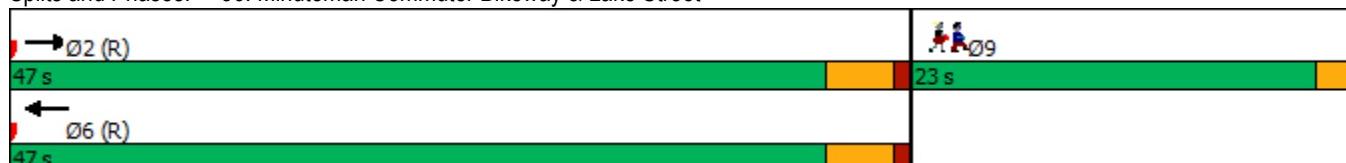
Maximum v/c Ratio: 0.69

Intersection Signal Delay: 39.8      Intersection LOS: D

Intersection Capacity Utilization 46.3%      ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 36: Minuteman Commuter Bikeway &amp; Lake Street



Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	18.0
Total Split (s)	23.0
Total Split (%)	33%
Maximum Green (s)	21.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	211
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	



Lane Group	EBT	WBT
Lane Group Flow (vph)	962	642
v/c Ratio	0.69	0.44
Control Delay	10.2	6.8
Queue Delay	50.7	1.6
Total Delay	60.9	8.3
Queue Length 50th (ft)	208	213
Queue Length 95th (ft)	282	169
Internal Link Dist (ft)	55	135
Turn Bay Length (ft)		
Base Capacity (vph)	1390	1460
Starvation Cap Reductn	0	603
Spillback Cap Reductn	602	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.22	0.75

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**Intersection Summary**

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Lanes, Volumes, Timings  
39: Brooks Avenue & Lake Street

2020 Baseline Weekday Evening Peak Hour  
01/14/2021

	↑	→	↓	↗	↖	↙	↖	↗	↑	↗	↖	↓	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	79	664	65	5	510	1	9	5	4	0	5	104	
Future Volume (vph)	79	664	65	5	510	1	9	5	4	0	5	104	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	14	14	14	13	13	13	12	12	12	12	12	12	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.989						0.972				0.871	
Flt Protected		0.995			0.999			0.976					
Satd. Flow (prot)	0	1994	0	0	1961	0	0	1802	0	0	1655	0	
Flt Permitted		0.896			0.993			0.730					
Satd. Flow (perm)	0	1796	0	0	1950	0	0	1348	0	0	1655	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		8						5				135	
Link Speed (mph)		30			30			30				30	
Link Distance (ft)		215			1126			206				208	
Travel Time (s)		4.9			25.6			4.7				4.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.75	0.75	0.75	0.77	0.77	0.77	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Adj. Flow (vph)	90	755	74	6	580	1	12	7	5	0	6	135	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	919	0	0	587	0	0	24	0	0	141	0	
Enter Blocked Intersection	No												
Lane Alignment	Left	Left	Right										
Median Width(ft)		0			0			0				0	
Link Offset(ft)		0			0			0				0	
Crosswalk Width(ft)		16			16			16				16	
Two way Left Turn Lane													
Headway Factor	0.92	0.92	0.92	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15		9	15		9	15		9	15		9	
Number of Detectors	1	2		1	2		1	2		1	2		
Detector Template	Left	Thru											
Leading Detector (ft)	20	100		20	100		20	100		20	100		
Trailing Detector (ft)	0	0		0	0		0	0		0	0		
Detector 1 Position(ft)	0	0		0	0		0	0		0	0		
Detector 1 Size(ft)	20	6		20	6		20	6		20	6		
Detector 1 Type	Cl+Ex	Cl+Ex											
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Detector 2 Position(ft)		94			94			94			94		
Detector 2 Size(ft)		6			6			6			6		
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		Perm	NA		Perm	NA				NA	
Protected Phases		2			6			8			4		
Permitted Phases	2			6			8			4			
Detector Phase	2	2		6	6		8	8		4	4		

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

Lanes, Volumes, Timings  
39: Brooks Avenue & Lake Street

2020 Baseline Weekday Evening Peak Hour  
01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Switch Phase</b>												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.0	21.0		21.0	21.0		14.0	14.0		14.0	14.0	
Total Split (s)	36.0	36.0		36.0	36.0		14.0	14.0		14.0	14.0	
Total Split (%)	51.4%	51.4%		51.4%	51.4%		20.0%	20.0%		20.0%	20.0%	
Maximum Green (s)	31.5	31.5		31.5	31.5		9.5	9.5		9.5	9.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0			0.0			0.0			0.0		
Total Lost Time (s)	4.5			4.5			4.5			4.5		
<b>Lead/Lag</b>												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		Min	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
<b>Pedestrian Calls (#/hr)</b>												
Act Effect Green (s)	43.3			43.3			6.9			6.9		
Actuated g/C Ratio	0.62			0.62			0.10			0.10		
v/c Ratio	0.83			0.49			0.18			0.50		
Control Delay	23.2			11.8			26.9			13.0		
Queue Delay	38.9			0.5			0.0			0.2		
Total Delay	62.1			12.3			26.9			13.2		
LOS	E			B			C			B		
Approach Delay	62.1			12.3			26.9			13.2		
Approach LOS	E			B			C			B		

**Intersection Summary**

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 40.0

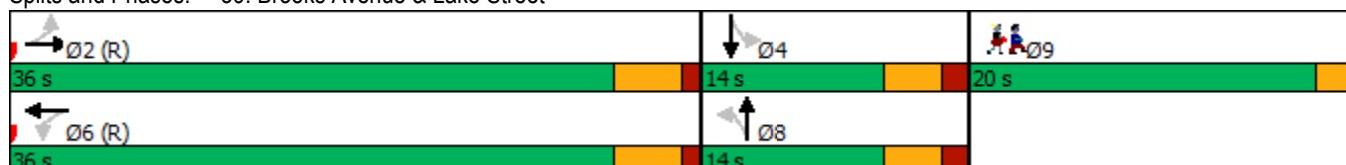
Intersection LOS: D

Intersection Capacity Utilization 89.4%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 39: Brooks Avenue & Lake Street

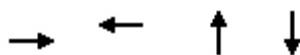


Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	29%
Maximum Green (s)	18.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	42
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Queues  
39: Brooks Avenue & Lake Street

2020 Baseline Weekday Evening Peak Hour

01/14/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	919	587	24	141
v/c Ratio	0.83	0.49	0.18	0.50
Control Delay	23.2	11.8	26.9	13.0
Queue Delay	38.9	0.5	0.0	0.2
Total Delay	62.1	12.3	26.9	13.2
Queue Length 50th (ft)	251	159	8	2
Queue Length 95th (ft)	#620	269	23	32
Internal Link Dist (ft)	135	1046	126	128
Turn Bay Length (ft)				
Base Capacity (vph)	1113	1206	187	341
Starvation Cap Reductn	258	0	0	0
Spillback Cap Reductn	0	257	0	17
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.07	0.62	0.13	0.44

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

2027 No-Build Weekday Morning Peak Hour

Intersection

Int Delay, s/veh 0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
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Lane Configurations						
Traffic Vol, veh/h	614	3	1	1189	5	1
Future Vol, veh/h	614	3	1	1189	5	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	87	87	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	819	4	1	1367	7	1

Major/Minor	Major1	Major2	Minor1
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Conflicting Flow All	0	0	823	0	2190	821
Stage 1	-	-	-	-	821	-
Stage 2	-	-	-	-	1369	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	816	-	51	378
Stage 1	-	-	-	-	436	-
Stage 2	-	-	-	-	239	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	816	-	51	378
Mov Cap-2 Maneuver	-	-	-	-	51	-
Stage 1	-	-	-	-	436	-
Stage 2	-	-	-	-	238	-

Approach	EB	WB	NB
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HCM Control Delay, s	0	0	74
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HCM LOS	F
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Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	60	-	-	816	-
HCM Lane V/C Ratio	0.133	-	-	0.001	-
HCM Control Delay (s)	74	-	-	9.4	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Intersection						
Int Delay, s/veh	2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	601	14	5	1166	24	6
Future Vol, veh/h	601	14	5	1166	24	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	93	93	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	801	19	5	1254	32	8
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	820	0	2075	811
Stage 1	-	-	-	-	811	-
Stage 2	-	-	-	-	1264	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	818	-	60	383
Stage 1	-	-	-	-	440	-
Stage 2	-	-	-	-	268	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	818	-	59	383
Mov Cap-2 Maneuver	-	-	-	-	59	-
Stage 1	-	-	-	-	440	-
Stage 2	-	-	-	-	263	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0		107.5		
HCM LOS		F				
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	71	-	-	818	-	
HCM Lane V/C Ratio	0.563	-	-	0.007	-	
HCM Control Delay (s)	107.5	-	-	9.4	0	
HCM Lane LOS	F	-	-	A	A	
HCM 95th %tile Q(veh)	2.4	-	-	0	-	

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↓	↔		
Traffic Vol, veh/h	605	5	3	1164	7	1
Future Vol, veh/h	605	5	3	1164	7	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	93	93	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	807	7	3	1252	9	1
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	814	0	2069	811
Stage 1	-	-	-	-	811	-
Stage 2	-	-	-	-	1258	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	822	-	60	383
Stage 1	-	-	-	-	440	-
Stage 2	-	-	-	-	270	-
Platoon blocked, %	-	-	-	-		
Mov Cap-1 Maneuver	-	-	822	-	59	383
Mov Cap-2 Maneuver	-	-	-	-	59	-
Stage 1	-	-	-	-	440	-
Stage 2	-	-	-	-	267	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	69.8			
HCM LOS			F			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	66	-	-	822	-	
HCM Lane V/C Ratio	0.162	-	-	0.004	-	
HCM Control Delay (s)	69.8	-	-	9.4	0	
HCM Lane LOS	F	-	-	A	A	
HCM 95th %tile Q(veh)	0.5	-	-	0	-	

## Intersection

Int Delay, s/veh 1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Lane Configurations</b>												
Traffic Vol, veh/h	0	585	18	8	1148	5	8	0	14	4	0	11
Future Vol, veh/h	0	585	18	8	1148	5	8	0	14	4	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	96	96	96	80	80	80	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0	0	0	10	0	0	0
Mvmt Flow	0	741	23	8	1196	5	10	0	18	4	0	12

Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	1201	0	0	764	0	0	1974	1970	753	1977	1979	1199
Stage 1	-	-	-	-	-	-	753	753	-	1215	1215	-
Stage 2	-	-	-	-	-	-	1221	1217	-	762	764	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.3	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.39	3.5	4	3.3
Pot Cap-1 Maneuver	588	-	-	858	-	-	47	63	397	47	62	228
Stage 1	-	-	-	-	-	-	405	420	-	224	256	-
Stage 2	-	-	-	-	-	-	222	256	-	400	416	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	588	-	-	858	-	-	44	61	397	44	60	228
Mov Cap-2 Maneuver	-	-	-	-	-	-	44	61	-	44	60	-
Stage 1	-	-	-	-	-	-	405	420	-	224	249	-
Stage 2	-	-	-	-	-	-	204	249	-	382	416	-

Approach	EB	WB		NB		SB		
HCM Control Delay, s	0	0.1		53.5		44.2		
HCM LOS				F		E		
<hr/>								
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	101	588	-	-	858	-	-	108
HCM Lane V/C Ratio	0.272	-	-	-	0.01	-	-	0.151
HCM Control Delay (s)	53.5	0	-	-	9.2	0	-	44.2
HCM Lane LOS	F	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	1	0	-	-	0	-	-	0.5

## Intersection

Int Delay, s/veh 4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Lane Configurations</b>												
Traffic Vol, veh/h	3	593	7	24	1136	3	9	0	22	3	0	16
Future Vol, veh/h	3	593	7	24	1136	3	9	0	22	3	0	16
Conflicting Peds, #/hr	0	0	0	304	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	97	97	97	75	75	75	75	75	75
Heavy Vehicles, %	0	2	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	4	706	8	25	1171	3	12	0	29	4	0	21

Major/Minor	Major1	Major2			Minor1			Minor2				
Conflicting Flow All	1174	0	0	1018	0	0	2255	2246	1014	1956	2249	1173
Stage 1	-	-	-	-	-	-	1022	1022	-	1223	1223	-
Stage 2	-	-	-	-	-	-	1233	1224	-	733	1026	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	602	-	-	689	-	-	30	42	292	49	42	236
Stage 1	-	-	-	-	-	-	287	316	-	221	254	-
Stage 2	-	-	-	-	-	-	219	254	-	415	315	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	602	-	-	514	-	-	18	27	218	38	27	236
Mov Cap-2 Maneuver	-	-	-	-	-	-	18	27	-	38	27	-
Stage 1	-	-	-	-	-	-	212	234	-	219	218	-
Stage 2	-	-	-	-	-	-	171	218	-	355	233	-

Approach	EB	WB			NB			SB			
HCM Control Delay, s	0.1	0.3			192.1			39.6			
HCM LOS					F			E			

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	52	602	-	-	514	-	-	129
HCM Lane V/C Ratio	0.795	0.006	-	-	0.048	-	-	0.196
HCM Control Delay (s)	192.1	11	0	-	12.4	0	-	39.6
HCM Lane LOS	F	B	A	-	B	A	-	E
HCM 95th %tile Q(veh)	3.3	0	-	-	0.2	-	-	0.7



Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Lane Configurations	↑ ↗	↑ ↗	↑ ↗ ↘	↑ ↗	↖	↖	
Traffic Volume (vph)	258	291	851	608	402	454	
Future Volume (vph)	258	291	851	608	402	454	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	11	10	11	12	
Storage Length (ft)	0	100		55	150		
Storage Lanes	1	1		1	1		
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00	
Fr <sub>t</sub>		0.850		0.850			
Flt Protected	0.950				0.950		
Satd. Flow (prot)	2025	1812	3421	1492	1728	1863	
Flt Permitted	0.950				0.143		
Satd. Flow (perm)	2025	1812	3421	1492	260	1863	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		244		211			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1126		640			645	
Travel Time (s)	25.6		14.5			14.7	
Peak Hour Factor	0.91	0.91	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%	
Adj. Flow (vph)	284	320	925	661	437	493	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	284	320	925	661	437	493	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	16		11			11	
Link Offset(ft)	0		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.04	1.09	1.04	1.00	
Turning Speed (mph)	15	9		9	15		
Number of Detectors	1	1	2	1	1	2	
Detector Template	Left	Right	Thru	Right	Left	Thru	
Leading Detector (ft)	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	
Detector 1 Size(ft)	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)			94		94		
Detector 2 Size(ft)			6		6		
Detector 2 Type			Cl+Ex		Cl+Ex		
Detector 2 Channel							
Detector 2 Extend (s)			0.0		0.0		
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA	



Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Protected Phases	4		6		5	2	9
Permitted Phases			4		6	2	
Detector Phase	4	4	6	6	5	2	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0	23.0	23.0	23.0	10.0	23.0	19.0
Total Split (s)	29.0	29.0	38.0	38.0	15.0	53.0	23.0
Total Split (%)	27.6%	27.6%	36.2%	36.2%	14.3%	50.5%	22%
Maximum Green (s)	22.0	22.0	31.0	31.0	9.0	46.0	20.0
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	2.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.0	7.0	
Lead/Lag			Lag	Lag	Lead		
Lead-Lag Optimize?			Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max	None
Walk Time (s)							5.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							35
Act Effct Green (s)	17.1	17.1	31.8	31.8	48.2	47.2	
Actuated g/C Ratio	0.19	0.19	0.36	0.36	0.54	0.53	
v/c Ratio	0.73	0.59	0.76	0.99	1.49	0.50	
Control Delay	46.5	14.1	32.7	55.2	258.1	18.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	46.5	14.1	32.7	55.2	258.1	18.7	
LOS	D	B	C	E	F	B	
Approach Delay	29.3		42.1			131.2	
Approach LOS	C		D			F	

## Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 88.8

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.49

Intersection Signal Delay: 66.2

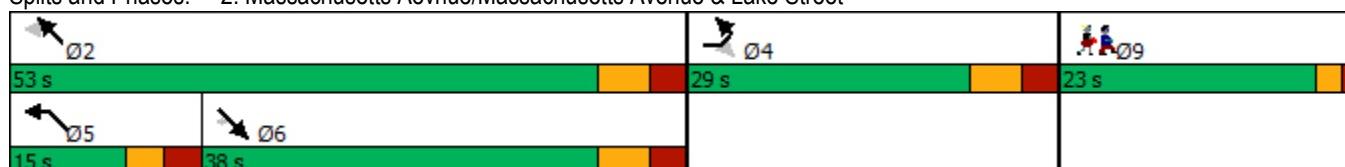
Intersection LOS: E

Intersection Capacity Utilization 76.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Massachusetts Avenue/Massachusetts Avenue &amp; Lake Street



## Queues

2027 No-Build Weekday Morning Peak Hour

## 2: Massachusetts Avenue/Massachusetts Avenue &amp; Lake Street

01/14/2021



Lane Group	EBL	EBR	SET	SER	NWL	NWT
Lane Group Flow (vph)	284	320	925	661	437	493
v/c Ratio	0.73	0.59	0.76	0.99	1.49	0.50
Control Delay	46.5	14.1	32.7	55.2	258.1	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.5	14.1	32.7	55.2	258.1	18.7
Queue Length 50th (ft)	167	40	281	~362	~336	213
Queue Length 95th (ft)	257	122	#409	#604	#550	332
Internal Link Dist (ft)	1046		560			565
Turn Bay Length (ft)		100		55	150	
Base Capacity (vph)	515	642	1225	670	293	990
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.50	0.76	0.99	1.49	0.50

## Intersection Summary

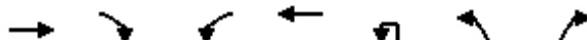
- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

## Lanes, Volumes, Timings

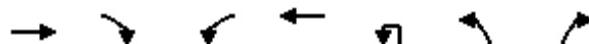
## 5: Route 2 EB On/Off Ramps &amp; Lake Street

2027 No-Build Weekday Morning Peak Hour

01/14/2021



Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Lane Configurations	↑	↑	↑	↑↑		↑	↑
Traffic Volume (vph)	311	493	210	419	271	221	520
Future Volume (vph)	311	493	210	419	271	221	520
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	10	11	12	16	14
Storage Length (ft)			150	110		0	0
Storage Lanes			1	1		1	1
Taper Length (ft)				25		25	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Fr <sub>t</sub>			0.850				0.850
Flt Protected				0.950			0.950
Satd. Flow (prot)	2132	1812	1685	3455	0	2037	1706
Flt Permitted				0.950			0.950
Satd. Flow (perm)	2132	1812	1685	3455	0	2037	1706
Right Turn on Red			Yes				Yes
Satd. Flow (RTOR)			333				402
Link Speed (mph)	30			30			30
Link Distance (ft)	239			505			387
Travel Time (s)	5.4			11.5			8.8
Peak Hour Factor	0.91	0.91	0.84	0.84	0.91	0.91	0.91
Heavy Vehicles (%)	1%	1%	0%	1%	0%	1%	1%
Adj. Flow (vph)	342	542	250	499	298	243	571
Shared Lane Traffic (%)							
Lane Group Flow (vph)	342	542	250	499	0	541	571
Enter Blocked Intersection	No						
Lane Alignment	Left	Right	Left	Left	R NA	Left	Right
Median Width(ft)	12			12			16
Link Offset(ft)	0			0			0
Crosswalk Width(ft)	16			16			16
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.09	1.04	1.00	0.85	0.92
Turning Speed (mph)		9	15		9	15	9
Number of Detectors	2	1	1	2	1	1	1
Detector Template	Thru	Right	Left	Thru	Left	Left	Right
Leading Detector (ft)	100	20	20	100	20	20	20
Trailing Detector (ft)	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20	20
Detector 1 Type	Cl+Ex						
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94			
Detector 2 Size(ft)	6			6			
Detector 2 Type	Cl+Ex			Cl+Ex			
Detector 2 Channel							
Detector 2 Extend (s)	0.0			0.0			
Turn Type	NA	Free	Prot	NA	Perm	Prot	Perm



Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Protected Phases	4		3	8		2	
Permitted Phases		Free			2		2
Detector Phase	4		3	8	2	2	2
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0		9.0	21.0	21.0	21.0	21.0
Total Split (s)	74.0		25.0	99.0	21.0	21.0	21.0
Total Split (%)	61.7%		20.8%	82.5%	17.5%	17.5%	17.5%
Maximum Green (s)	69.0		20.0	94.0	16.0	16.0	16.0
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max	Max
Walk Time (s)	5.0			5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0	0
Act Effct Green (s)	15.7	63.2	16.2	37.0		16.2	16.2
Actuated g/C Ratio	0.25	1.00	0.26	0.59		0.26	0.26
v/c Ratio	0.64	0.30	0.58	0.25		1.04	0.78
Control Delay	27.7	0.4	27.3	6.5		78.8	16.8
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	27.7	0.4	27.3	6.5		78.8	16.8
LOS	C	A	C	A		E	B
Approach Delay	11.0			13.4		47.0	
Approach LOS	B			B		D	

## Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 63.2

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 26.2

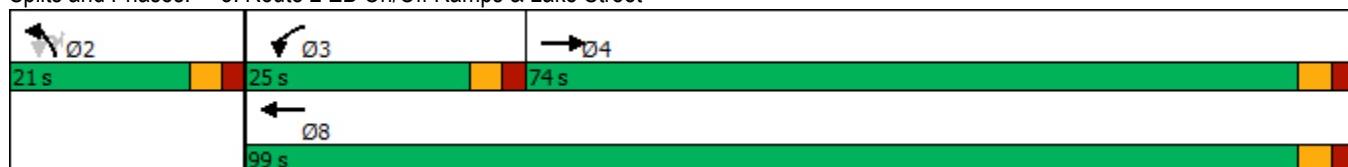
Intersection LOS: C

Intersection Capacity Utilization 67.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: Route 2 EB On/Off Ramps &amp; Lake Street

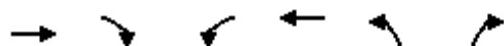


## Queues

## 5: Route 2 EB On/Off Ramps &amp; Lake Street

2027 No-Build Weekday Morning Peak Hour

01/14/2021



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	342	542	250	499	541	571
v/c Ratio	0.64	0.30	0.58	0.25	1.04	0.78
Control Delay	27.7	0.4	27.3	6.5	78.8	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.7	0.4	27.3	6.5	78.8	16.8
Queue Length 50th (ft)	118	0	83	42	~234	54
Queue Length 95th (ft)	204	0	151	57	#482	#243
Internal Link Dist (ft)	159			425	307	
Turn Bay Length (ft)		150	110			
Base Capacity (vph)	2110	1812	538	3455	520	735
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.30	0.46	0.14	1.04	0.78

## Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

## Lanes, Volumes, Timings

## 7: Route 2 WB Off Ramp &amp; Lake Street

2027 No-Build Weekday Morning Peak Hour

01/14/2021



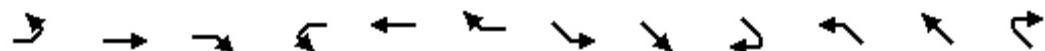
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	224	607	0	0	478	716	0	0	0	151	6	10
Future Volume (vph)	224	607	0	0	478	716	0	0	0	151	6	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	10	12	12	12	11	12	16
Storage Length (ft)	250			0	0	75	0		0	100		0
Storage Lanes	1			0	0	1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Fr <sub>t</sub>						0.850						0.850
Flt Protected	0.950									0.950	0.956	
Satd. Flow (prot)	1805	1881	0	0	1837	1492	0	0	0	1579	1594	1830
Flt Permitted	0.950									0.950	0.956	
Satd. Flow (perm)	1805	1881	0	0	1837	1492	0	0	0	1579	1594	1830
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						490						136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			380			459			529	
Travel Time (s)		11.5			8.6			10.4			12.0	
Peak Hour Factor	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92	0.81	0.81	0.81
Heavy Vehicles (%)	0%	1%	0%	0%	0%	1%	0%	0%	0%	5%	50%	0%
Adj. Flow (vph)	255	690	0	0	520	778	0	0	0	186	7	12
Shared Lane Traffic (%)										48%		
Lane Group Flow (vph)	255	690	0	0	520	778	0	0	0	97	96	12
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.04	1.09	1.00	1.00	1.00	1.04	1.00	0.85
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2	1				1	2	1
Detector Template	Left	Thru			Thru	Right				Left	Thru	Right
Leading Detector (ft)	20	100			100	20				20	100	20
Trailing Detector (ft)	0	0			0	0				0	0	0
Detector 1 Position(ft)	0	0			0	0				0	0	0
Detector 1 Size(ft)	20	6			6	20				20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex				Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Prot	NA			NA	Perm				Split	NA	Perm

## Lanes, Volumes, Timings

## 7: Route 2 WB Off Ramp &amp; Lake Street

2027 No-Build Weekday Morning Peak Hour

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Protected Phases	7	4			8					2	2	
Permitted Phases						8						2
Detector Phase	7	4			8	8				2	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Minimum Split (s)	8.5	22.0			22.0	22.0				22.0	22.0	22.0
Total Split (s)	16.0	38.0			22.0	22.0				22.0	22.0	22.0
Total Split (%)	26.7%	63.3%			36.7%	36.7%				36.7%	36.7%	36.7%
Maximum Green (s)	11.5	32.0			16.0	16.0				16.0	16.0	16.0
Yellow Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
All-Red Time (s)	0.5	2.0			2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0			6.0	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Recall Mode	None	None			None	None				Max	Max	Max
Walk Time (s)		5.0			5.0	5.0				5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0	11.0				11.0	11.0	11.0
Pedestrian Calls (#/hr)	0				0	0				0	0	0
Act Effct Green (s)	11.0	31.5			16.0	16.0				16.0	16.0	16.0
Actuated g/C Ratio	0.18	0.53			0.27	0.27				0.27	0.27	0.27
v/c Ratio	0.77	0.69			1.05	1.03				0.23	0.22	0.02
Control Delay	40.9	15.0			81.3	51.2				19.0	18.9	0.1
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	40.9	15.0			81.3	51.2				19.0	18.9	0.1
LOS	D	B			F	D				B	B	A
Approach Delay		22.0			63.2						17.8	
Approach LOS		C			E						B	

## Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 59.5

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.05

Intersection Signal Delay: 43.5

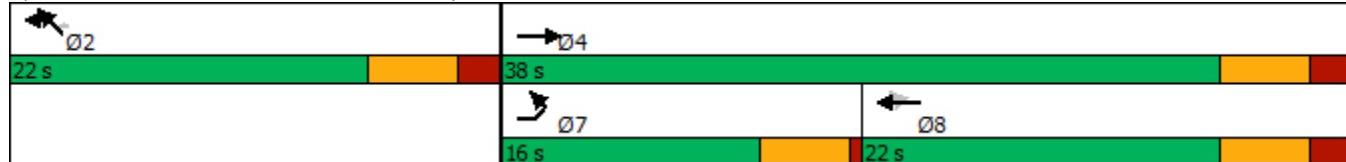
Intersection LOS: D

Intersection Capacity Utilization 74.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 7: Route 2 WB Off Ramp &amp; Lake Street



## Queues

2027 No-Build Weekday Morning Peak Hour

## 7: Route 2 WB Off Ramp &amp; Lake Street

01/14/2021



Lane Group	EBL	EBT	WBT	WBR	NWL	NWT	NWR
Lane Group Flow (vph)	255	690	520	778	97	96	12
v/c Ratio	0.77	0.69	1.05	1.03	0.23	0.22	0.02
Control Delay	40.9	15.0	81.3	51.2	19.0	18.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	15.0	81.3	51.2	19.0	18.9	0.1
Queue Length 50th (ft)	88	167	~214	~135	28	28	0
Queue Length 95th (ft)	#179	265	#378	#357	56	55	0
Internal Link Dist (ft)			425	300		449	
Turn Bay Length (ft)	250			75	100		
Base Capacity (vph)	348	1012	494	759	425	429	591
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.68	1.05	1.03	0.23	0.22	0.02

## Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Lane Configurations			↑↑			↑↑		
Traffic Volume (vph)	0	0	1596	0	0	1062		
Future Volume (vph)	0	0	1596	0	0	1062		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.88		
Frt						0.850		
Flt Protected								
Satd. Flow (prot)	0	0	4729	0	0	2617		
Flt Permitted								
Satd. Flow (perm)	0	0	4729	0	0	2617		
Right Turn on Red				Yes		Yes		
Satd. Flow (RTOR)						7		
Link Speed (mph)		30	30		30			
Link Distance (ft)		201	192		296			
Travel Time (s)		4.6	4.4		6.7			
Peak Hour Factor	0.92	0.92	0.90	0.92	0.92	0.85		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	1%		
Adj. Flow (vph)	0	0	1773	0	0	1249		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	1773	0	0	1249		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		0	0		0			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	15			9	15	30		
Number of Detectors			2			1		
Detector Template			Thru		Right			
Leading Detector (ft)			100		20			
Trailing Detector (ft)			0		0			
Detector 1 Position(ft)			0		0			
Detector 1 Size(ft)			6		20			
Detector 1 Type			Cl+Ex		Cl+Ex			
Detector 1 Channel								
Detector 1 Extend (s)			0.0		0.0			
Detector 1 Queue (s)			0.0		0.0			
Detector 1 Delay (s)			0.0		0.0			
Detector 2 Position(ft)			94					
Detector 2 Size(ft)			6					
Detector 2 Type			Cl+Ex					
Detector 2 Channel								
Detector 2 Extend (s)			0.0					
Turn Type			NA		custom			
Protected Phases			2		3 4	3	4	
Permitted Phases								
Detector Phase			2		3 4			

## Lanes, Volumes, Timings

11: Route 2/Alewife Brook Parkway &amp; Route 16

2027 No-Build Weekday Morning Peak Hour

01/14/2021



Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
<b>Switch Phase</b>								
Minimum Initial (s)								
					10.0		10.0	10.0
Minimum Split (s)								
					15.0		19.0	15.0
Total Split (s)								
					58.0		36.0	26.0
Total Split (%)								
					48.3%		30%	22%
Maximum Green (s)								
					53.0		30.0	21.0
Yellow Time (s)								
					4.0		4.0	3.5
All-Red Time (s)								
					1.0		2.0	1.5
Lost Time Adjust (s)								
					0.0			
Total Lost Time (s)								
					5.0			
<b>Lead/Lag</b>								
Lead-Lag Optimize?								
Vehicle Extension (s)								
					3.0		3.0	3.0
Recall Mode								
					C-Max		Max	Max
Walk Time (s)								
							5.0	
Flash Dont Walk (s)								
							8.0	
Pedestrian Calls (#/hr)								
							0	
Act Effect Green (s)								
					53.0		56.0	
Actuated g/C Ratio								
					0.44		0.47	
v/c Ratio								
					0.85		1.02	
Control Delay								
					5.6		62.8	
Queue Delay								
					4.5		0.0	
Total Delay								
					10.1		62.8	
LOS								
					B		E	
Approach Delay								
					10.1		62.8	
Approach LOS								
					B		E	

**Intersection Summary**

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 31.9

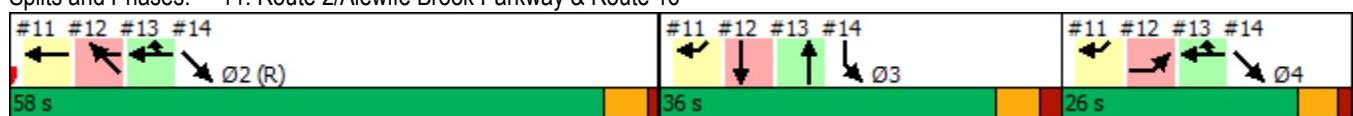
Intersection LOS: C

Intersection Capacity Utilization 84.7%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 11: Route 2/Alewife Brook Parkway &amp; Route 16





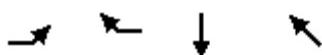
Lane Group	WBT	SWR
Lane Group Flow (vph)	1773	1249
v/c Ratio	0.85	1.02
Control Delay	5.6	62.8
Queue Delay	4.5	0.0
Total Delay	10.1	62.8
Queue Length 50th (ft)	43	~581
Queue Length 95th (ft)	m40	#659
Internal Link Dist (ft)	112	
Turn Bay Length (ft)		
Base Capacity (vph)	2088	1225
Starvation Cap Reductn	252	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.97	1.02

**Intersection Summary**

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Lanes, Volumes, Timings  
12: Alewife Brook Parkway & Route 2

2027 No-Build Weekday Morning Peak Hour  
01/14/2021

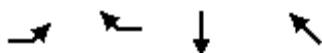


Lane Group	EBL	WBR	SBT	NWT
Lane Configurations	↑↑	↑	↑↑	↑↑
Traffic Volume (vph)	505	169	506	1427
Future Volume (vph)	505	169	506	1427
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	13	16	13	13
Lane Util. Factor	0.97	1.00	0.95	0.95
Frt	0.865			
Flt Protected	0.950			
Satd. Flow (prot)	3224	1581	3291	3291
Flt Permitted	0.950			
Satd. Flow (perm)	3224	1581	3291	3291
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)		30	30	
Link Distance (ft)		202	278	
Travel Time (s)		4.6	6.3	
Peak Hour Factor	0.97	0.94	0.85	0.90
Heavy Vehicles (%)	1%	6%	2%	2%
Adj. Flow (vph)	521	180	595	1586
Shared Lane Traffic (%)				
Lane Group Flow (vph)	521	180	595	1586
Enter Blocked Intersection	No	No	No	No
Lane Alignment	Left	R NA	Left	L NA
Median Width(ft)		0	0	
Link Offset(ft)		0	0	
Crosswalk Width(ft)		16	16	
Two way Left Turn Lane				
Headway Factor	1.10	0.97	1.10	1.10
Turning Speed (mph)	15	30		
Number of Detectors	1	1	2	2
Detector Template	Left	Right	Thru	Thru
Leading Detector (ft)	20	20	100	100
Trailing Detector (ft)	0	0	0	0
Detector 1 Position(ft)	0	0	0	0
Detector 1 Size(ft)	20	20	6	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel				
Detector 1 Extend (s)	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94	94	
Detector 2 Size(ft)		6	6	
Detector 2 Type		Cl+Ex	Cl+Ex	
Detector 2 Channel				
Detector 2 Extend (s)		0.0	0.0	
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	2!	3	2!
Permitted Phases				
Detector Phase	4	2	3	2

Lanes, Volumes, Timings  
12: Alewife Brook Parkway & Route 2

2027 No-Build Weekday Morning Peak Hour

01/14/2021



Lane Group	EBL	WBR	SBT	NWT
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.0	15.0	19.0	15.0
Total Split (s)	26.0	58.0	36.0	58.0
Total Split (%)	21.7%	48.3%	30.0%	48.3%
Maximum Green (s)	21.0	53.0	30.0	53.0
Yellow Time (s)	3.5	4.0	4.0	4.0
All-Red Time (s)	1.5	1.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.0	5.0
Lead/Lag	Lag	Lead		
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	C-Max	Max	C-Max
Walk Time (s)			5.0	
Flash Dont Walk (s)			8.0	
Pedestrian Calls (#/hr)			0	
Act Effect Green (s)	21.0	53.0	30.0	53.0
Actuated g/C Ratio	0.18	0.44	0.25	0.44
v/c Ratio	0.92	0.26	0.72	1.09
Control Delay	72.2	14.3	47.1	85.5
Queue Delay	0.0	2.4	0.0	3.6
Total Delay	72.2	16.7	47.1	89.1
LOS	E	B	D	F
Approach Delay			47.1	89.1
Approach LOS			D	F

Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 72.8

Intersection LOS: E

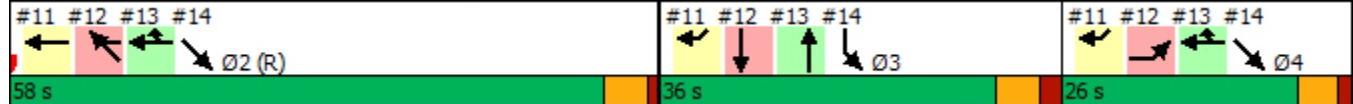
Intersection Capacity Utilization 103.7%

ICU Level of Service G

Analysis Period (min) 15

! Phase conflict between lane groups.

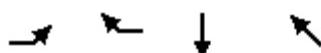
Splits and Phases: 12: Alewife Brook Parkway & Route 2



Queues  
12: Alewife Brook Parkway & Route 2

2027 No-Build Weekday Morning Peak Hour

01/14/2021



Lane Group	EBL	WBR	SBT	NWT
Lane Group Flow (vph)	521	180	595	1586
v/c Ratio	0.92	0.26	0.72	1.09
Control Delay	72.2	14.3	47.1	85.5
Queue Delay	0.0	2.4	0.0	3.6
Total Delay	72.2	16.7	47.1	89.1
Queue Length 50th (ft)	206	86	223	~728
Queue Length 95th (ft)	#308	138	269	#868
Internal Link Dist (ft)			122	198
Turn Bay Length (ft)				
Base Capacity (vph)	564	698	822	1453
Starvation Cap Reductn	0	397	0	0
Spillback Cap Reductn	0	6	0	13
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.92	0.60	0.72	1.10

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

## Lanes, Volumes, Timings

2027 No-Build Weekday Morning Peak Hour

13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	169	54	0	224	0	0	0	0
Future Volume (vph)	0	0	0	0	169	54	0	224	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0				200	0			0	0		0
Storage Lanes	0				1	0			0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr <sub>t</sub>						0.850						
Flt Protected												
Satd. Flow (prot)	0	0	0	0	1613	1333	0	3154	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	1613	1333	0	3154	0	0	0	0
Right Turn on Red				No		No	No		No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		161			1225			227			185	
Travel Time (s)		3.7			27.8			5.2			4.2	
Confl. Peds. (#/hr)					2							
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	6%	9%	2%	3%	2%	2%	2%	2%
Adj. Flow (vph)	0	0	0	0	184	59	0	249	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	184	59	0	249	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	0				0			0			0	
Link Offset(ft)	0				0			0			0	
Crosswalk Width(ft)	16				16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors					2	1		2				
Detector Template						Thru	Right		Thru			
Leading Detector (ft)					100	20		100				
Trailing Detector (ft)					0	0		0				
Detector 1 Position(ft)					0	0		0				
Detector 1 Size(ft)					6	20		6				
Detector 1 Type					Cl+Ex	Cl+Ex		Cl+Ex				
Detector 1 Channel												
Detector 1 Extend (s)					0.0	0.0		0.0				
Detector 1 Queue (s)					0.0	0.0		0.0				
Detector 1 Delay (s)					0.0	0.0		0.0				
Detector 2 Position(ft)					94			94				
Detector 2 Size(ft)					6			6				
Detector 2 Type					Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				

Lane Group	Ø2	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		

## Lanes, Volumes, Timings

2027 No-Build Weekday Morning Peak Hour

13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type					NA	Prot		NA				
Protected Phases					24	24			3			
Permitted Phases												
Detector Phase					24	24			3			
Switch Phase												
Minimum Initial (s)								10.0				
Minimum Split (s)								19.0				
Total Split (s)								36.0				
Total Split (%)								30.0%				
Maximum Green (s)								30.0				
Yellow Time (s)								4.0				
All-Red Time (s)								2.0				
Lost Time Adjust (s)								0.0				
Total Lost Time (s)								6.0				
Lead/Lag								Lead				
Lead-Lag Optimize?												
Vehicle Extension (s)								3.0				
Recall Mode								Max				
Walk Time (s)								5.0				
Flash Dont Walk (s)								8.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)					79.0	79.0		30.0				
Actuated g/C Ratio					0.66	0.66		0.25				
v/c Ratio					0.17	0.07		0.32				
Control Delay					8.4	7.6		38.0				
Queue Delay					0.1	0.0		0.0				
Total Delay					8.5	7.6		38.0				
LOS					A	A		D				
Approach Delay					8.3			38.0				
Approach LOS					A			D				

## Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 23.3

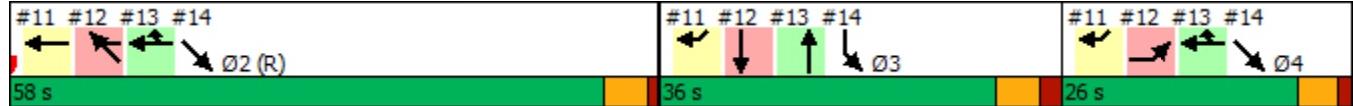
Intersection LOS: C

Intersection Capacity Utilization 27.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access



Lane Group	Ø2	Ø4
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	15.0	15.0
Total Split (s)	58.0	26.0
Total Split (%)	48%	22%
Maximum Green (s)	53.0	21.0
Yellow Time (s)	4.0	3.5
All-Red Time (s)	1.0	1.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	C-Max	Max
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		



Lane Group	WBT	WBR	NBT
Lane Group Flow (vph)	184	59	249
v/c Ratio	0.17	0.07	0.32
Control Delay	8.4	7.6	38.0
Queue Delay	0.1	0.0	0.0
Total Delay	8.5	7.6	38.0
Queue Length 50th (ft)	50	15	83
Queue Length 95th (ft)	81	31	121
Internal Link Dist (ft)	1145		147
Turn Bay Length (ft)		200	
Base Capacity (vph)	1061	877	788
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	223	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.22	0.07	0.32

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#### Intersection Summary

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Lanes, Volumes, Timings  
14: Alewife Brook Parkway & Route 2

2027 No-Build Weekday Morning Peak Hour

01/14/2021



Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Lane Configurations	↑↑			↑↑				
Traffic Volume (vph)	506	0	0	1102	0	0		
Future Volume (vph)	506	0	0	1102	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	1.00		
Frt								
Flt Protected	0.950							
Satd. Flow (prot)	3193	0	0	3324	0	0		
Flt Permitted	0.950							
Satd. Flow (perm)	3193	0	0	3324	0	0		
Right Turn on Red	Yes	Yes			Yes			
Satd. Flow (RTOR)	216							
Link Speed (mph)	30			30	30			
Link Distance (ft)	155			297	139			
Travel Time (s)	3.5			6.8	3.2			
Peak Hour Factor	0.85	0.92	0.92	0.97	0.92	0.92		
Heavy Vehicles (%)	2%	2%	2%	1%	2%	2%		
Adj. Flow (vph)	595	0	0	1136	0	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	595	0	0	1136	0	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Right	Left	Left	Left	Right		
Median Width(ft)	26			0	0			
Link Offset(ft)	0			0	0			
Crosswalk Width(ft)	16			16	16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	30	9	15			9		
Number of Detectors	1			2				
Detector Template	Left			Thru				
Leading Detector (ft)	20			100				
Trailing Detector (ft)	0			0				
Detector 1 Position(ft)	0			0				
Detector 1 Size(ft)	20			6				
Detector 1 Type	Cl+Ex			Cl+Ex				
Detector 1 Channel								
Detector 1 Extend (s)	0.0			0.0				
Detector 1 Queue (s)	0.0			0.0				
Detector 1 Delay (s)	0.0			0.0				
Detector 2 Position(ft)				94				
Detector 2 Size(ft)				6				
Detector 2 Type				Cl+Ex				
Detector 2 Channel								
Detector 2 Extend (s)				0.0				
Turn Type	Prot			NA				
Protected Phases	3			2 4			2	4
Permitted Phases								
Detector Phase	3			2 4				

Lanes, Volumes, Timings  
14: Alewife Brook Parkway & Route 2

2027 No-Build Weekday Morning Peak Hour

01/14/2021



Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Switch Phase								
Minimum Initial (s)	10.0						10.0	10.0
Minimum Split (s)	19.0						15.0	15.0
Total Split (s)	36.0						58.0	26.0
Total Split (%)	30.0%						48%	22%
Maximum Green (s)	30.0						53.0	21.0
Yellow Time (s)	4.0						4.0	3.5
All-Red Time (s)	2.0						1.0	1.5
Lost Time Adjust (s)	0.0							
Total Lost Time (s)	6.0							
Lead/Lag	Lead						Lag	
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0						3.0	3.0
Recall Mode	Max						C-Max	Max
Walk Time (s)	5.0							
Flash Dont Walk (s)	8.0							
Pedestrian Calls (#/hr)	0							
Act Effect Green (s)	30.0				79.0			
Actuated g/C Ratio	0.25				0.66			
v/c Ratio	0.62				0.52			
Control Delay	2.8				11.7			
Queue Delay	1.0				0.0			
Total Delay	3.7				11.7			
LOS	A				B			
Approach Delay	3.7				11.7			
Approach LOS	A				B			

Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 9.0

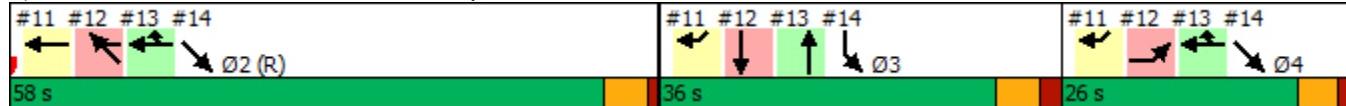
Intersection LOS: A

Intersection Capacity Utilization 59.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 14: Alewife Brook Parkway & Route 2



Queues  
14: Alewife Brook Parkway & Route 2

2027 No-Build Weekday Morning Peak Hour

01/14/2021



Lane Group	SBL	SET
Lane Group Flow (vph)	595	1136
v/c Ratio	0.62	0.52
Control Delay	2.8	11.7
Queue Delay	1.0	0.0
Total Delay	3.7	11.7
Queue Length 50th (ft)	5	220
Queue Length 95th (ft)	0	272
Internal Link Dist (ft)	75	217
Turn Bay Length (ft)		
Base Capacity (vph)	960	2188
Starvation Cap Reductn	156	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.74	0.52

Intersection Summary

## Lanes, Volumes, Timings

2027 No-Build Weekday Morning Peak Hour

## 36: Minuteman Commuter Bikeway &amp; Lake Street

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	618	0	0	1163	0	0	0	0	0	0	0
Future Volume (vph)	0	618	0	0	1163	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	16	16	16	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	2049	0	0	2153	0	0	0	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	2049	0	0	2153	0	0	0	0	0	0	0
Right Turn on Red				Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		135			215			175			206	
Travel Time (s)		3.1			4.9			4.0			4.7	
Peak Hour Factor	0.84	0.84	0.84	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	736	0	0	1199	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	736	0	0	1199	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.85	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2			2							
Detector Template		Thru			Thru							
Leading Detector (ft)		100			100							
Trailing Detector (ft)		0			0							
Detector 1 Position(ft)		0			0							
Detector 1 Size(ft)		6			6							
Detector 1 Type		Cl+Ex			Cl+Ex							
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0							
Detector 1 Queue (s)		0.0			0.0							
Detector 1 Delay (s)		0.0			0.0							
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA			NA							
Protected Phases		2			6							
Permitted Phases												
Detector Phase		2			6							

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Switch Phase</b>												
Minimum Initial (s)		4.0			4.0							
Minimum Split (s)		20.5			20.5							
Total Split (s)		47.0			47.0							
Total Split (%)		67.1%			67.1%							
Maximum Green (s)		42.5			42.5							
Yellow Time (s)		3.5			3.5							
All-Red Time (s)		1.0			1.0							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		4.5			4.5							
<b>Lead/Lag</b>												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0							
Recall Mode		C-Max			C-Max							
Walk Time (s)												
Flash Dont Walk (s)												
<b>Pedestrian Calls (#/hr)</b>												
Act Effect Green (s)		47.5			47.5							
Actuated g/C Ratio		0.68			0.68							
v/c Ratio		0.53			0.82							
Control Delay		7.4			17.3							
Queue Delay		53.1			50.4							
Total Delay		60.4			67.6							
LOS		E			E							
Approach Delay		60.4			67.6							
Approach LOS		E			E							

**Intersection Summary**

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 64.9      Intersection LOS: E

Intersection Capacity Utilization 65.0%      ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 36: Minuteman Commuter Bikeway &amp; Lake Street



Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	33%
Maximum Green (s)	21.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	304
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	



Lane Group	EBT	WBT
Lane Group Flow (vph)	736	1199
v/c Ratio	0.53	0.82
Control Delay	7.4	17.3
Queue Delay	53.1	50.4
Total Delay	60.4	67.6
Queue Length 50th (ft)	132	569
Queue Length 95th (ft)	180	m580
Internal Link Dist (ft)	55	135
Turn Bay Length (ft)		
Base Capacity (vph)	1390	1460
Starvation Cap Reductn	0	729
Spillback Cap Reductn	804	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.26	1.64

#### Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lanes, Volumes, Timings  
39: Brooks Avenue & Lake Street

2027 No-Build Weekday Morning Peak Hour

01/14/2021

	↑	→	↓	↗	↖	↙	↖	↑	↗	↘	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	541	46	6	1004	0	38	4	5	3	7	121
Future Volume (vph)	31	541	46	6	1004	0	38	4	5	3	7	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	13	13	13	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990						0.985				0.875
Flt Protected		0.998						0.961				0.999
Satd. Flow (prot)	0	1978	0	0	1944	0	0	1799	0	0	1661	0
Flt Permitted		0.918			0.997			0.487			0.993	
Satd. Flow (perm)	0	1819	0	0	1938	0	0	911	0	0	1651	0
Right Turn on Red		Yes				Yes			Yes			Yes
Satd. Flow (RTOR)		6					7				155	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		215			1126			206			208	
Travel Time (s)		4.9			25.6			4.7			4.7	
Peak Hour Factor	0.91	0.91	0.91	0.87	0.87	0.87	0.75	0.75	0.75	0.78	0.78	0.78
Heavy Vehicles (%)	0%	1%	5%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	34	595	51	7	1154	0	51	5	7	4	9	155
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	680	0	0	1161	0	0	63	0	0	168	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.92	0.92	0.92	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru										
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex										
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		3	8		4	4	

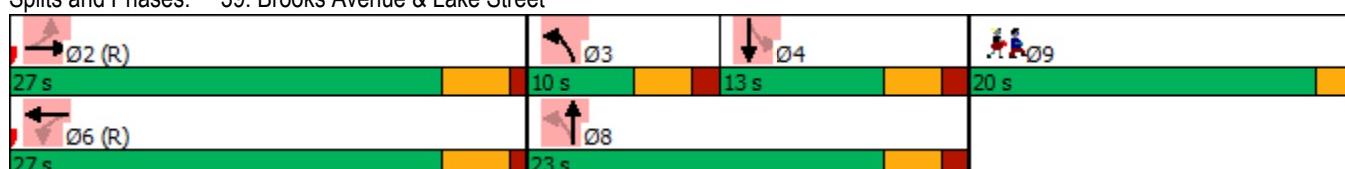
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

Lanes, Volumes, Timings  
39: Brooks Avenue & Lake Street

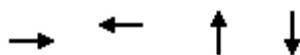
2027 No-Build Weekday Morning Peak Hour  
01/14/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Switch Phase</b>												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.5	20.5		20.5	20.5		9.0	21.0		13.0	13.0	
Total Split (s)	27.0	27.0		27.0	27.0		10.0	23.0		13.0	13.0	
Total Split (%)	38.6%	38.6%		38.6%	38.6%		14.3%	32.9%		18.6%	18.6%	
Maximum Green (s)	22.5	22.5		22.5	22.5		5.5	18.5		8.5	8.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0			0.0			0.0			0.0		
Total Lost Time (s)	4.5			4.5			4.5			4.5		
Lead/Lag							Lead			Lag		Lag
Lead-Lag Optimize?							Yes			Yes		Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
<b>Pedestrian Calls (#/hr)</b>												
Act Effect Green (s)	40.9			40.9			9.3			9.3		
Actuated g/C Ratio	0.58			0.58			0.13			0.13		
v/c Ratio	0.64			1.03			0.50			0.48		
Control Delay	23.3			56.0			38.1			10.7		
Queue Delay	29.6			31.1			0.0			0.4		
Total Delay	52.9			87.1			38.1			11.2		
LOS	D			F			D			B		
Approach Delay	52.9			87.1			38.1			11.2		
Approach LOS	D			F			D			B		
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	70											
Actuated Cycle Length:	70											
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection												
Natural Cycle:	110											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.03											
Intersection Signal Delay:	68.2						Intersection LOS: E					
Intersection Capacity Utilization	77.4%						ICU Level of Service D					
Analysis Period (min)	15											

Splits and Phases: 39: Brooks Avenue & Lake Street



Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	18.0
Total Split (s)	20.0
Total Split (%)	29%
Maximum Green (s)	18.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	52
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	680	1161	63	168
V/c Ratio	0.64	1.03	0.50	0.48
Control Delay	23.3	56.0	38.1	10.7
Queue Delay	29.6	31.1	0.0	0.4
Total Delay	52.9	87.1	38.1	11.2
Queue Length 50th (ft)	246	~635	23	5
Queue Length 95th (ft)	#442	#877	44	35
Internal Link Dist (ft)	135	1046	126	128
Turn Bay Length (ft)				
Base Capacity (vph)	1065	1132	245	372
Starvation Cap Reductn	411	0	0	0
Spillback Cap Reductn	0	478	1	37
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.04	1.78	0.26	0.50

#### Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

2027 No-Build Weekday Evening Peak Hour

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	831	3	1	602	9	4
Future Vol, veh/h	831	3	1	602	9	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	94	94	75	75
Heavy Vehicles, %	0	0	0	0	29	0
Mvmt Flow	1001	4	1	640	12	5
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	1005	0	1645	1003
Stage 1	-	-	-	-	1003	-
Stage 2	-	-	-	-	642	-
Critical Hdwy	-	-	4.1	-	6.69	6.2
Critical Hdwy Stg 1	-	-	-	-	5.69	-
Critical Hdwy Stg 2	-	-	-	-	5.69	-
Follow-up Hdwy	-	-	2.2	-	3.761	3.3
Pot Cap-1 Maneuver	-	-	697	-	94	297
Stage 1	-	-	-	-	316	-
Stage 2	-	-	-	-	476	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	697	-	94	297
Mov Cap-2 Maneuver	-	-	-	-	94	-
Stage 1	-	-	-	-	316	-
Stage 2	-	-	-	-	475	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	40.3			
HCM LOS			E			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	119	-	-	697	-	
HCM Lane V/C Ratio	0.146	-	-	0.002	-	
HCM Control Delay (s)	40.3	-	-	10.2	0	
HCM Lane LOS	E	-	-	B	A	
HCM 95th %tile Q(veh)	0.5	-	-	0	-	

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	829	6	9	588	15	5
Future Vol, veh/h	829	6	9	588	15	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	89	89	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	953	7	10	661	20	7
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	960	0	1638	957
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	681	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	725	-	112	315
Stage 1	-	-	-	-	376	-
Stage 2	-	-	-	-	506	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	725	-	110	315
Mov Cap-2 Maneuver	-	-	-	-	110	-
Stage 1	-	-	-	-	376	-
Stage 2	-	-	-	-	495	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0.2		39.4		
HCM LOS				E		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	131	-	-	725	-	
HCM Lane V/C Ratio	0.204	-	-	0.014	-	
HCM Control Delay (s)	39.4	-	-	10	0	
HCM Lane LOS	E	-	-	B	A	
HCM 95th %tile Q(veh)	0.7	-	-	0	-	

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↓	↔		
Traffic Vol, veh/h	833	1	1	591	6	4
Future Vol, veh/h	833	1	1	591	6	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	89	89	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	957	1	1	664	8	5
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	958	0	1624	958
Stage 1	-	-	-	-	958	-
Stage 2	-	-	-	-	666	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	726	-	114	315
Stage 1	-	-	-	-	376	-
Stage 2	-	-	-	-	515	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	726	-	114	315
Mov Cap-2 Maneuver	-	-	-	-	114	-
Stage 1	-	-	-	-	376	-
Stage 2	-	-	-	-	514	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0		30.8		
HCM LOS				D		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	153	-	-	726	-	
HCM Lane V/C Ratio	0.087	-	-	0.002	-	
HCM Control Delay (s)	30.8	-	-	10	0	
HCM Lane LOS	D	-	-	A	A	
HCM 95th %tile Q(veh)	0.3	-	-	0	-	

## Intersection

Int Delay, s/veh 1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Lane Configurations</b>												
Traffic Vol, veh/h	4	814	19	11	578	8	13	1	6	3	0	1
Future Vol, veh/h	4	814	19	11	578	8	13	1	6	3	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	947	22	13	672	9	17	1	8	4	0	1

Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	681	0	0	969	0	0	1671	1675	958	1676	1682	677
Stage 1	-	-	-	-	-	-	968	968	-	703	703	-
Stage 2	-	-	-	-	-	-	703	707	-	973	979	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	921	-	-	719	-	-	77	96	315	76	95	456
Stage 1	-	-	-	-	-	-	308	335	-	431	443	-
Stage 2	-	-	-	-	-	-	431	441	-	306	331	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	921	-	-	719	-	-	74	92	315	71	91	456
Mov Cap-2 Maneuver	-	-	-	-	-	-	74	92	-	71	91	-
Stage 1	-	-	-	-	-	-	304	331	-	426	430	-
Stage 2	-	-	-	-	-	-	417	428	-	293	327	-

Approach	EB	WB		NB		SB	
HCM Control Delay, s	0	0.2		55.6		47.5	
HCM LOS				F		E	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	97	921	-	-	719	-	-	90
HCM Lane V/C Ratio	0.275	0.005	-	-	0.018	-	-	0.059
HCM Control Delay (s)	55.6	8.9	0	-	10.1	0	-	47.5
HCM Lane LOS	F	A	A	-	B	A	-	E
HCM 95th %tile Q(veh)	1	0	-	-	0.1	-	-	0.2

## Intersection

Int Delay, s/veh 8.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Lane Configurations</b>												
Traffic Vol, veh/h	19	800	4	60	577	16	9	0	43	9	0	11
Future Vol, veh/h	19	800	4	60	577	16	9	0	43	9	0	11
Conflicting Peds, #/hr	0	0	0	304	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	88	88	88	81	81	81	80	80	80
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	23	964	5	68	656	18	11	0	53	11	0	14

Major/Minor	Major1	Major2			Minor1			Minor2				
Conflicting Flow All	674	0	0	1273	0	0	2125	2127	1271	1840	2120	665
Stage 1	-	-	-	-	-	-	1317	1317	-	801	801	-
Stage 2	-	-	-	-	-	-	808	810	-	1039	1319	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	927	-	-	552	-	-	37	50	207	59	51	464
Stage 1	-	-	-	-	-	-	196	229	-	381	400	-
Stage 2	-	-	-	-	-	-	378	396	-	281	229	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	927	-	-	412	-	-	20	26	155	30	26	464
Mov Cap-2 Maneuver	-	-	-	-	-	-	20	26	-	30	26	-
Stage 1	-	-	-	-	-	-	138	162	-	360	294	-
Stage 2	-	-	-	-	-	-	270	291	-	175	162	-

Approach	EB	WB			NB			SB			
HCM Control Delay, s	0.2	1.4			179.4			97.8			
HCM LOS					F			F			

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	71	927	-	-	412	-	-	62
HCM Lane V/C Ratio	0.904	0.025	-	-	0.165	-	-	0.403
HCM Control Delay (s)	179.4	9	0	-	15.5	0	-	97.8
HCM Lane LOS	F	A	A	-	C	A	-	F
HCM 95th %tile Q(veh)	4.5	0.1	-	-	0.6	-	-	1.5



Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Lane Configurations	↓	↑	↑↑	↑	↓	↑	
Traffic Volume (vph)	430	277	658	189	348	739	
Future Volume (vph)	430	277	658	189	348	739	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	11	10	11	12	
Storage Length (ft)	0	100		55	150		
Storage Lanes	1	1		1	1		
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00	
Fr <sub>t</sub>		0.850		0.850			
Flt Protected	0.950				0.950		
Satd. Flow (prot)	2046	1830	3421	1507	1745	1863	
Flt Permitted	0.950				0.220		
Satd. Flow (perm)	2046	1830	3421	1507	404	1863	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		140		85			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1126		640			645	
Travel Time (s)	25.6		14.5			14.7	
Peak Hour Factor	0.88	0.88	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%	
Adj. Flow (vph)	489	315	715	205	378	803	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	489	315	715	205	378	803	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	16		11			11	
Link Offset(ft)	0		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.04	1.09	1.04	1.00	
Turning Speed (mph)	15	9		9	15		
Number of Detectors	1	1	2	1	1	2	
Detector Template	Left	Right	Thru	Right	Left	Thru	
Leading Detector (ft)	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	
Detector 1 Size(ft)	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)			94		94		
Detector 2 Size(ft)			6		6		
Detector 2 Type			Cl+Ex		Cl+Ex		
Detector 2 Channel							
Detector 2 Extend (s)			0.0		0.0		
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA	



Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Protected Phases	4		6		5	2	9
Permitted Phases			4		6	2	
Detector Phase	4	4	6	6	5	2	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0	23.0	23.0	23.0	10.0	23.0	19.0
Total Split (s)	29.0	29.0	38.0	38.0	15.0	53.0	23.0
Total Split (%)	27.6%	27.6%	36.2%	36.2%	14.3%	50.5%	22%
Maximum Green (s)	22.0	22.0	31.0	31.0	9.0	46.0	20.0
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	2.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.0	7.0	
Lead/Lag			Lag	Lag	Lead		
Lead-Lag Optimize?			Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max	None
Walk Time (s)							5.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							35
Act Effct Green (s)	22.2	22.2	31.3	31.3	47.5	46.5	
Actuated g/C Ratio	0.24	0.24	0.34	0.34	0.51	0.50	
v/c Ratio	1.01	0.58	0.62	0.37	1.13	0.87	
Control Delay	80.9	23.3	30.4	17.2	110.9	34.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	80.9	23.3	30.4	17.2	110.9	34.8	
LOS	F	C	C	B	F	C	
Approach Delay	58.3		27.5			59.2	
Approach LOS	E		C			E	

## Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 93.4

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.13

Intersection Signal Delay: 48.9

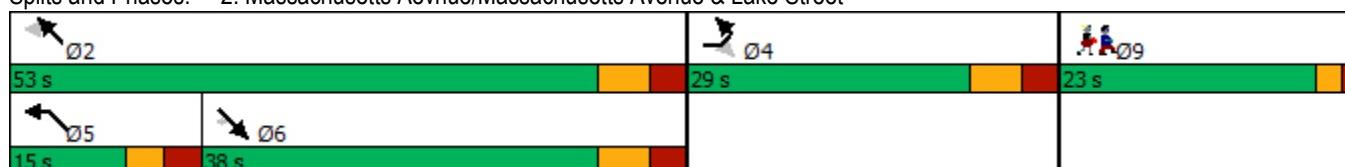
Intersection LOS: D

Intersection Capacity Utilization 78.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Massachusetts Avenue/Massachusetts Avenue &amp; Lake Street



## Queues

2027 No-Build Weekday Evening Peak Hour

## 2: Massachusetts Avenue/Massachusetts Avenue &amp; Lake Street

01/14/2021



Lane Group	EBL	EBR	SET	SER	NWL	NWT
Lane Group Flow (vph)	489	315	715	205	378	803
v/c Ratio	1.01	0.58	0.62	0.37	1.13	0.87
Control Delay	80.9	23.3	30.4	17.2	110.9	34.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.9	23.3	30.4	17.2	110.9	34.8
Queue Length 50th (ft)	~359	100	211	58	~217	480
Queue Length 95th (ft)	#537	185	277	122	#422	#740
Internal Link Dist (ft)	1046		560			565
Turn Bay Length (ft)		100		55	150	
Base Capacity (vph)	486	542	1147	561	335	927
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.58	0.62	0.37	1.13	0.87

## Intersection Summary

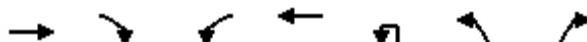
- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

## Lanes, Volumes, Timings

2027 No-Build Weekday Evening Peak Hour

## 5: Route 2 EB On/Off Ramps &amp; Lake Street

01/14/2021



Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑		↘	↖
Traffic Volume (vph)	545	181	171	302	14	531	632
Future Volume (vph)	545	181	171	302	14	531	632
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	10	11	12	16	14
Storage Length (ft)		150	110		0	0	
Storage Lanes		1	1		1	1	
Taper Length (ft)			25		25		
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Fr <sub>t</sub>		0.850				0.850	
Flt Protected			0.950			0.950	
Satd. Flow (prot)	2153	1664	1652	3490	0	2046	1723
Flt Permitted			0.950			0.950	
Satd. Flow (perm)	2153	1664	1652	3490	0	2046	1723
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		70				441	
Link Speed (mph)	30		30		30		
Link Distance (ft)	373		505		387		
Travel Time (s)	8.5		11.5		8.8		
Peak Hour Factor	0.94	0.94	0.87	0.87	0.96	0.96	0.96
Heavy Vehicles (%)	0%	10%	2%	0%	0%	0%	0%
Adj. Flow (vph)	580	193	197	347	15	553	658
Shared Lane Traffic (%)							
Lane Group Flow (vph)	580	193	197	347	0	568	658
Enter Blocked Intersection	No						
Lane Alignment	Left	Right	Left	Left	R NA	Left	Right
Median Width(ft)	12		12		16		
Link Offset(ft)	0		0		0		
Crosswalk Width(ft)	16		16		16		
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.09	1.04	1.00	0.85	0.92
Turning Speed (mph)		9	15		9	15	9
Number of Detectors	2	1	1	2	1	1	1
Detector Template	Thru	Right	Left	Thru	Left	Left	Right
Leading Detector (ft)	100	20	20	100	20	20	20
Trailing Detector (ft)	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20	20
Detector 1 Type	Cl+Ex						
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94		94				
Detector 2 Size(ft)	6		6				
Detector 2 Type	Cl+Ex		Cl+Ex				
Detector 2 Channel							
Detector 2 Extend (s)	0.0		0.0				
Turn Type	NA	Free	Prot	NA	Perm	Prot	Perm



Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Protected Phases	4		3	8		2	
Permitted Phases		Free			2		2
Detector Phase	4		3	8	2	2	2
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0		9.0	21.0	21.0	21.0	21.0
Total Split (s)	74.0		25.0	99.0	21.0	21.0	21.0
Total Split (%)	61.7%		20.8%	82.5%	17.5%	17.5%	17.5%
Maximum Green (s)	69.0		20.0	94.0	16.0	16.0	16.0
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max	Max
Walk Time (s)	5.0			5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0	0
Act Effct Green (s)	25.7	71.5	14.1	44.9		16.4	16.4
Actuated g/C Ratio	0.36	1.00	0.20	0.63		0.23	0.23
v/c Ratio	0.75	0.12	0.61	0.16		1.21	0.90
Control Delay	26.9	0.1	36.1	5.3		144.0	27.9
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	26.9	0.1	36.1	5.3		144.0	27.9
LOS	C	A	D	A		F	C
Approach Delay	20.3			16.4		81.7	
Approach LOS	C			B		F	

## Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 71.5

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.21

Intersection Signal Delay: 49.1

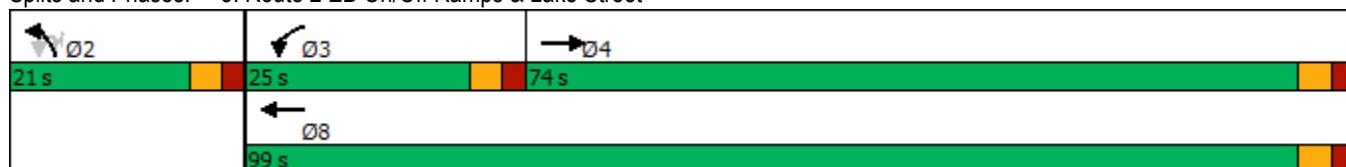
Intersection LOS: D

Intersection Capacity Utilization 80.9%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 5: Route 2 EB On/Off Ramps &amp; Lake Street



## Queues

2027 No-Build Weekday Evening Peak Hour

## 5: Route 2 EB On/Off Ramps &amp; Lake Street

01/14/2021



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	580	193	197	347	568	658
v/c Ratio	0.75	0.12	0.61	0.16	1.21	0.90
Control Delay	26.9	0.1	36.1	5.3	144.0	27.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.9	0.1	36.1	5.3	144.0	27.9
Queue Length 50th (ft)	215	0	79	28	~315	90
Queue Length 95th (ft)	361	0	156	40	#634	#361
Internal Link Dist (ft)	293			425	307	
Turn Bay Length (ft)		150	110			
Base Capacity (vph)	2001	1664	472	3490	468	734
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.12	0.42	0.10	1.21	0.90

## Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

## Lanes, Volumes, Timings

## 7: Route 2 WB Off Ramp &amp; Lake Street

2027 No-Build Weekday Evening Peak Hour

01/14/2021



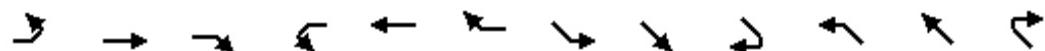
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations	↑	↑			↑	↑				↑	↑	↑
Traffic Volume (vph)	368	809	0	0	265	346	0	0	0	208	22	25
Future Volume (vph)	368	809	0	0	265	346	0	0	0	208	22	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	10	12	12	12	11	12	16
Storage Length (ft)	250		0	0		75	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Fr <sub>t</sub>						0.850						0.850
Flt Protected	0.950									0.950	0.961	
Satd. Flow (prot)	1805	1881	0	0	1801	1463	0	0	0	1641	1705	1830
Flt Permitted	0.950									0.950	0.961	
Satd. Flow (perm)	1805	1881	0	0	1801	1463	0	0	0	1641	1705	1830
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						380						136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			380			459			529	
Travel Time (s)		11.5			8.6			10.4			12.0	
Peak Hour Factor	0.88	0.88	0.88	0.91	0.91	0.91	0.92	0.92	0.92	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	0%	0%	2%	3%	0%	0%	0%	1%	5%	0%
Adj. Flow (vph)	418	919	0	0	291	380	0	0	0	219	23	26
Shared Lane Traffic (%)										45%		
Lane Group Flow (vph)	418	919	0	0	291	380	0	0	0	120	122	26
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.04	1.09	1.00	1.00	1.00	1.04	1.00	0.85
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2	1				1	2	1
Detector Template	Left	Thru			Thru	Right				Left	Thru	Right
Leading Detector (ft)	20	100			100	20				20	100	20
Trailing Detector (ft)	0	0			0	0				0	0	0
Detector 1 Position(ft)	0	0			0	0				0	0	0
Detector 1 Size(ft)	20	6			6	20				20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex				Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Prot	NA			NA	Perm				Split	NA	Perm

## Lanes, Volumes, Timings

## 7: Route 2 WB Off Ramp &amp; Lake Street

2027 No-Build Weekday Evening Peak Hour

01/14/2021



Lane Group	EBL	EBT	EBC	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Protected Phases	7	4			8					2	2	
Permitted Phases						8						2
Detector Phase	7	4			8	8				2	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Minimum Split (s)	8.5	22.0			22.0	22.0				22.0	22.0	22.0
Total Split (s)	16.0	38.0			22.0	22.0				22.0	22.0	22.0
Total Split (%)	26.7%	63.3%			36.7%	36.7%				36.7%	36.7%	36.7%
Maximum Green (s)	11.5	32.0			16.0	16.0				16.0	16.0	16.0
Yellow Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
All-Red Time (s)	0.5	2.0			2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0			6.0	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Recall Mode	None	None			None	None				Max	Max	Max
Walk Time (s)		5.0			5.0	5.0				5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0	11.0				11.0	11.0	11.0
Pedestrian Calls (#/hr)	0				0	0				0	0	0
Act Effct Green (s)	11.5	30.6			14.6	14.6				16.0	16.0	16.0
Actuated g/C Ratio	0.20	0.52			0.25	0.25				0.27	0.27	0.27
v/c Ratio	1.18	0.94			0.65	0.59				0.27	0.26	0.04
Control Delay	134.8	32.4			27.2	6.6				19.4	19.3	0.1
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	134.8	32.4			27.2	6.6				19.4	19.3	0.1
LOS	F	C			C	A				B	B	A
Approach Delay		64.4			15.5						17.5	
Approach LOS		E			B						B	

## Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 58.7

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.18

Intersection Signal Delay: 44.5

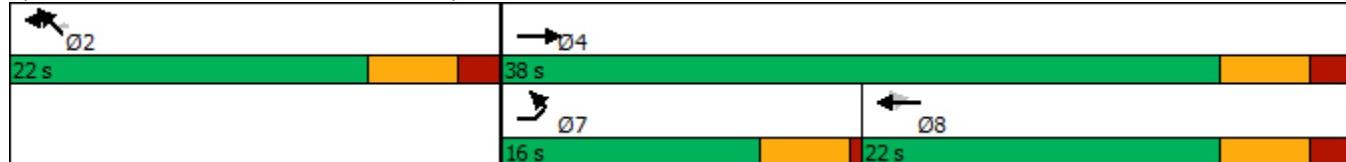
Intersection LOS: D

Intersection Capacity Utilization 61.9%

ICU Level of Service B

Analysis Period (min) 15

## Splits and Phases: 7: Route 2 WB Off Ramp &amp; Lake Street



## Queues

2027 No-Build Weekday Evening Peak Hour

## 7: Route 2 WB Off Ramp &amp; Lake Street

01/14/2021



Lane Group	EBL	EBT	WBT	WBR	NWL	NWT	NWR
Lane Group Flow (vph)	418	919	291	380	120	122	26
v/c Ratio	1.18	0.94	0.65	0.59	0.27	0.26	0.04
Control Delay	134.8	32.4	27.2	6.6	19.4	19.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	134.8	32.4	27.2	6.6	19.4	19.3	0.1
Queue Length 50th (ft)	~191	275	92	0	35	36	0
Queue Length 95th (ft)	#331	#503	162	56	75	76	0
Internal Link Dist (ft)			425	300		449	
Turn Bay Length (ft)	250			75	100		
Base Capacity (vph)	353	1027	492	675	448	465	598
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.18	0.89	0.59	0.56	0.27	0.26	0.04

## Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Lane Configurations			↑↑			↑↑		
Traffic Volume (vph)	0	0	2209	0	0	1131		
Future Volume (vph)	0	0	2209	0	0	1131		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.88		
Frt						0.850		
Flt Protected								
Satd. Flow (prot)	0	0	4776	0	0	2617		
Flt Permitted								
Satd. Flow (perm)	0	0	4776	0	0	2617		
Right Turn on Red				Yes		Yes		
Satd. Flow (RTOR)						1		
Link Speed (mph)		30	30		30			
Link Distance (ft)		201	192		296			
Travel Time (s)		4.6	4.4		6.7			
Peak Hour Factor	0.92	0.92	0.97	0.97	0.98	0.98		
Heavy Vehicles (%)	2%	2%	1%	0%	0%	1%		
Adj. Flow (vph)	0	0	2277	0	0	1154		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	2277	0	0	1154		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		0	0		0			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	15			9	15	30		
Number of Detectors			2			1		
Detector Template			Thru		Right			
Leading Detector (ft)			100		20			
Trailing Detector (ft)			0		0			
Detector 1 Position(ft)			0		0			
Detector 1 Size(ft)			6		20			
Detector 1 Type			Cl+Ex		Cl+Ex			
Detector 1 Channel								
Detector 1 Extend (s)			0.0		0.0			
Detector 1 Queue (s)			0.0		0.0			
Detector 1 Delay (s)			0.0		0.0			
Detector 2 Position(ft)			94					
Detector 2 Size(ft)			6					
Detector 2 Type			Cl+Ex					
Detector 2 Channel								
Detector 2 Extend (s)			0.0					
Turn Type			NA		custom			
Protected Phases			2		3 4	3	4	
Permitted Phases								
Detector Phase			2		3 4			



Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
<b>Switch Phase</b>								
Minimum Initial (s)			10.0				10.0	10.0
Minimum Split (s)			15.0				19.0	15.0
Total Split (s)			58.0				36.0	26.0
Total Split (%)			48.3%				30%	22%
Maximum Green (s)			53.0				30.0	21.0
Yellow Time (s)			4.0				4.0	3.5
All-Red Time (s)			1.0				2.0	1.5
Lost Time Adjust (s)			0.0					
Total Lost Time (s)			5.0					
<b>Lead/Lag</b>							Lead	Lag
<b>Lead-Lag Optimize?</b>								
Vehicle Extension (s)			3.0				3.0	3.0
Recall Mode			C-Max				Max	Max
Walk Time (s)							5.0	
Flash Dont Walk (s)							8.0	
Pedestrian Calls (#/hr)							0	
Act Effect Green (s)			53.0				56.0	
Actuated g/C Ratio			0.44				0.47	
v/c Ratio			1.08				0.95	
Control Delay			46.7				46.7	
Queue Delay			1.5				0.0	
Total Delay			48.2				46.7	
LOS			D				D	
Approach Delay			48.2			46.7		
Approach LOS			D			D		

**Intersection Summary**

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 47.7

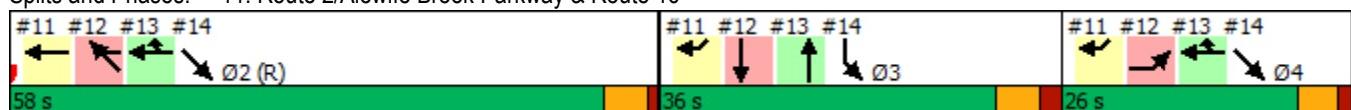
Intersection LOS: D

Intersection Capacity Utilization 100.6%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 11: Route 2/Alewife Brook Parkway &amp; Route 16





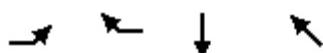
Lane Group	WBT	SWR
Lane Group Flow (vph)	2277	1154
v/c Ratio	1.08	0.95
Control Delay	46.7	46.7
Queue Delay	1.5	0.0
Total Delay	48.2	46.7
Queue Length 50th (ft)	~702	472
Queue Length 95th (ft)	m#57	#644
Internal Link Dist (ft)	112	
Turn Bay Length (ft)		
Base Capacity (vph)	2109	1221
Starvation Cap Reductn	7	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.08	0.95

**Intersection Summary**

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Lanes, Volumes, Timings  
12: Alewife Brook Parkway & Route 2

2027 No-Build Weekday Evening Peak Hour  
01/14/2021

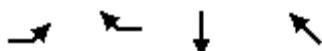


Lane Group	EBL	WBR	SBT	NWT
Lane Configurations	↑↑	↑	↑↑	↑↑
Traffic Volume (vph)	610	591	250	1618
Future Volume (vph)	610	591	250	1618
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	13	16	13	13
Lane Util. Factor	0.97	1.00	0.95	0.95
Frt	0.865			
Flt Protected	0.950			
Satd. Flow (prot)	3257	1660	3291	3324
Flt Permitted	0.950			
Satd. Flow (perm)	3257	1660	3291	3324
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)		30	30	
Link Distance (ft)		202	278	
Travel Time (s)		4.6	6.3	
Peak Hour Factor	0.90	0.95	0.98	0.97
Heavy Vehicles (%)	0%	1%	2%	1%
Adj. Flow (vph)	678	622	255	1668
Shared Lane Traffic (%)				
Lane Group Flow (vph)	678	622	255	1668
Enter Blocked Intersection	No	No	No	No
Lane Alignment	Left	R NA	Left	L NA
Median Width(ft)		0	0	
Link Offset(ft)		0	0	
Crosswalk Width(ft)		16	16	
Two way Left Turn Lane				
Headway Factor	1.10	0.97	1.10	1.10
Turning Speed (mph)	15	30		
Number of Detectors	1	1	2	2
Detector Template	Left	Right	Thru	Thru
Leading Detector (ft)	20	20	100	100
Trailing Detector (ft)	0	0	0	0
Detector 1 Position(ft)	0	0	0	0
Detector 1 Size(ft)	20	20	6	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel				
Detector 1 Extend (s)	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94	94	
Detector 2 Size(ft)		6	6	
Detector 2 Type		Cl+Ex	Cl+Ex	
Detector 2 Channel				
Detector 2 Extend (s)		0.0	0.0	
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	2!	3	2!
Permitted Phases				
Detector Phase	4	2	3	2

Lanes, Volumes, Timings  
12: Alewife Brook Parkway & Route 2

2027 No-Build Weekday Evening Peak Hour

01/14/2021



Lane Group	EBL	WBR	SBT	NWT
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.0	15.0	19.0	15.0
Total Split (s)	26.0	58.0	36.0	58.0
Total Split (%)	21.7%	48.3%	30.0%	48.3%
Maximum Green (s)	21.0	53.0	30.0	53.0
Yellow Time (s)	3.5	4.0	4.0	4.0
All-Red Time (s)	1.5	1.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.0	5.0
Lead/Lag	Lag	Lead		
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	C-Max	Max	C-Max
Walk Time (s)			5.0	
Flash Dont Walk (s)			8.0	
Pedestrian Calls (#/hr)			0	
Act Effect Green (s)	21.0	53.0	30.0	53.0
Actuated g/C Ratio	0.18	0.44	0.25	0.44
v/c Ratio	1.19	0.85	0.31	1.14
Control Delay	145.7	29.8	37.8	102.5
Queue Delay	0.0	3.3	0.0	0.3
Total Delay	145.7	33.1	37.8	102.8
LOS	F	C	D	F
Approach Delay			37.8	102.8
Approach LOS			D	F

Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 93.2

Intersection LOS: F

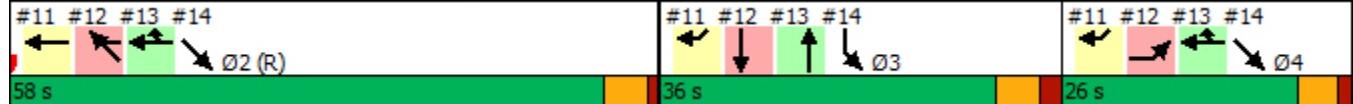
Intersection Capacity Utilization 134.7%

ICU Level of Service H

Analysis Period (min) 15

! Phase conflict between lane groups.

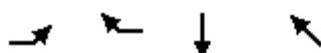
Splits and Phases: 12: Alewife Brook Parkway & Route 2



Queues  
12: Alewife Brook Parkway & Route 2

2027 No-Build Weekday Evening Peak Hour

01/14/2021



Lane Group	EBL	WBR	SBT	NWT
Lane Group Flow (vph)	678	622	255	1668
V/c Ratio	1.19	0.85	0.31	1.14
Control Delay	145.7	29.8	37.8	102.5
Queue Delay	0.0	3.3	0.0	0.3
Total Delay	145.7	33.1	37.8	102.8
Queue Length 50th (ft)	~326	422	84	~792
Queue Length 95th (ft)	#446	#639	123	#931
Internal Link Dist (ft)			122	198
Turn Bay Length (ft)				
Base Capacity (vph)	569	733	822	1468
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	53	0	107
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.19	0.91	0.31	1.23

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

## Lanes, Volumes, Timings

2027 No-Build Weekday Evening Peak Hour

13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	591	328	0	238	0	0	0	0
Future Volume (vph)	0	0	0	0	591	328	0	238	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0					200	0		0	0	0	0
Storage Lanes	0					1	0		0	0	0	0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr <sub>t</sub>							0.850					
Flt Protected												
Satd. Flow (prot)	0	0	0	0	1693	1439	0	3217	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	1693	1439	0	3217	0	0	0	0
Right Turn on Red				No		No	No		No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		161			1225			227			185	
Travel Time (s)		3.7			27.8			5.2			4.2	
Confl. Peds. (#/hr)						2						
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.97	0.97	0.97	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	1%	1%	0%	1%	0%	2%	2%	2%
Adj. Flow (vph)	0	0	0	0	622	345	0	245	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	622	345	0	245	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	0				0			0			0	
Link Offset(ft)	0				0			0			0	
Crosswalk Width(ft)	16				16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors					2	1		2				
Detector Template						Thru	Right		Thru			
Leading Detector (ft)					100	20		100				
Trailing Detector (ft)					0	0		0				
Detector 1 Position(ft)					0	0		0				
Detector 1 Size(ft)					6	20		6				
Detector 1 Type					Cl+Ex	Cl+Ex		Cl+Ex				
Detector 1 Channel												
Detector 1 Extend (s)					0.0	0.0		0.0				
Detector 1 Queue (s)					0.0	0.0		0.0				
Detector 1 Delay (s)					0.0	0.0		0.0				
Detector 2 Position(ft)					94			94				
Detector 2 Size(ft)					6			6				
Detector 2 Type					Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				

Lane Group	Ø2	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		

## Lanes, Volumes, Timings

13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access

2027 No-Build Weekday Evening Peak Hour

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type					NA	Prot		NA				
Protected Phases					24	24			3			
Permitted Phases												
Detector Phase					24	24			3			
Switch Phase												
Minimum Initial (s)								10.0				
Minimum Split (s)								19.0				
Total Split (s)								36.0				
Total Split (%)								30.0%				
Maximum Green (s)								30.0				
Yellow Time (s)								4.0				
All-Red Time (s)								2.0				
Lost Time Adjust (s)								0.0				
Total Lost Time (s)								6.0				
Lead/Lag								Lead				
Lead-Lag Optimize?												
Vehicle Extension (s)								3.0				
Recall Mode								Max				
Walk Time (s)								5.0				
Flash Dont Walk (s)								8.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)				79.0	79.0			30.0				
Actuated g/C Ratio				0.66	0.66			0.25				
v/c Ratio				0.56	0.36			0.30				
Control Delay				13.5	10.5			37.8				
Queue Delay				2.1	0.0			0.0				
Total Delay				15.6	10.5			37.8				
LOS				B	B			D				
Approach Delay				13.8				37.8				
Approach LOS				B				D				

## Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 18.6

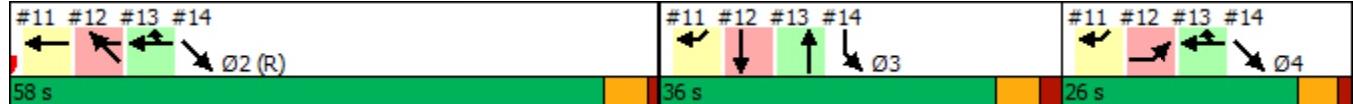
Intersection LOS: B

Intersection Capacity Utilization 52.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access



Lane Group	Ø2	Ø4
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	15.0	15.0
Total Split (s)	58.0	26.0
Total Split (%)	48%	22%
Maximum Green (s)	53.0	21.0
Yellow Time (s)	4.0	3.5
All-Red Time (s)	1.0	1.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	C-Max	Max
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		



Lane Group	WBT	WBR	NBT
Lane Group Flow (vph)	622	345	245
v/c Ratio	0.56	0.36	0.30
Control Delay	13.5	10.5	37.8
Queue Delay	2.1	0.0	0.0
Total Delay	15.6	10.5	37.8
Queue Length 50th (ft)	239	110	81
Queue Length 95th (ft)	337	165	119
Internal Link Dist (ft)	1145		147
Turn Bay Length (ft)		200	
Base Capacity (vph)	1114	947	804
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	337	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.80	0.36	0.30

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**Intersection Summary**

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Lanes, Volumes, Timings  
14: Alewife Brook Parkway & Route 2

2027 No-Build Weekday Evening Peak Hour

01/14/2021

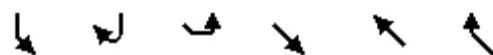


Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Lane Configurations								
Traffic Volume (vph)	250	0	0	987	0	0		
Future Volume (vph)	250	0	0	987	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	1.00		
Frt								
Flt Protected	0.950							
Satd. Flow (prot)	3193	0	0	3324	0	0		
Flt Permitted	0.950							
Satd. Flow (perm)	3193	0	0	3324	0	0		
Right Turn on Red	Yes	Yes				Yes		
Satd. Flow (RTOR)	234							
Link Speed (mph)	30			30	30			
Link Distance (ft)	155			297	139			
Travel Time (s)	3.5			6.8	3.2			
Peak Hour Factor	0.98	0.98	0.90	0.90	0.92	0.92		
Heavy Vehicles (%)	2%	0%	0%	1%	2%	2%		
Adj. Flow (vph)	255	0	0	1097	0	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	255	0	0	1097	0	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Right	Left	Left	Left	Right		
Median Width(ft)	26			0	0			
Link Offset(ft)	0			0	0			
Crosswalk Width(ft)	16			16	16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	30	9	15			9		
Number of Detectors	1			2				
Detector Template	Left			Thru				
Leading Detector (ft)	20			100				
Trailing Detector (ft)	0			0				
Detector 1 Position(ft)	0			0				
Detector 1 Size(ft)	20			6				
Detector 1 Type	Cl+Ex			Cl+Ex				
Detector 1 Channel								
Detector 1 Extend (s)	0.0			0.0				
Detector 1 Queue (s)	0.0			0.0				
Detector 1 Delay (s)	0.0			0.0				
Detector 2 Position(ft)				94				
Detector 2 Size(ft)				6				
Detector 2 Type				Cl+Ex				
Detector 2 Channel								
Detector 2 Extend (s)				0.0				
Turn Type	Prot			NA				
Protected Phases	3			2 4			2	4
Permitted Phases								
Detector Phase	3			2 4				

Lanes, Volumes, Timings  
14: Alewife Brook Parkway & Route 2

2027 No-Build Weekday Evening Peak Hour

01/14/2021



Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Switch Phase								
Minimum Initial (s)	10.0						10.0	10.0
Minimum Split (s)	19.0						15.0	15.0
Total Split (s)	36.0						58.0	26.0
Total Split (%)	30.0%						48%	22%
Maximum Green (s)	30.0						53.0	21.0
Yellow Time (s)	4.0						4.0	3.5
All-Red Time (s)	2.0						1.0	1.5
Lost Time Adjust (s)	0.0							
Total Lost Time (s)	6.0							
Lead/Lag	Lead						Lag	
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0						3.0	3.0
Recall Mode	Max						C-Max	Max
Walk Time (s)	5.0							
Flash Dont Walk (s)	8.0							
Pedestrian Calls (#/hr)	0							
Act Effect Green (s)	30.0				79.0			
Actuated g/C Ratio	0.25				0.66			
v/c Ratio	0.26				0.50			
Control Delay	0.8				11.4			
Queue Delay	0.5				0.0			
Total Delay	1.3				11.4			
LOS	A				B			
Approach Delay	1.3				11.4			
Approach LOS	A				B			

Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 9.5

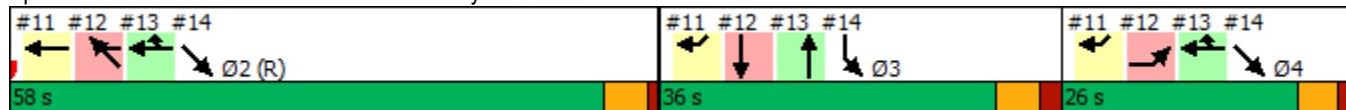
Intersection LOS: A

Intersection Capacity Utilization 47.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 14: Alewife Brook Parkway & Route 2



Queues  
14: Alewife Brook Parkway & Route 2

2027 No-Build Weekday Evening Peak Hour

01/14/2021



Lane Group	SBL	SET
Lane Group Flow (vph)	255	1097
v/c Ratio	0.26	0.50
Control Delay	0.8	11.4
Queue Delay	0.5	0.0
Total Delay	1.3	11.4
Queue Length 50th (ft)	0	209
Queue Length 95th (ft)	1	258
Internal Link Dist (ft)	75	217
Turn Bay Length (ft)		
Base Capacity (vph)	973	2188
Starvation Cap Reductn	391	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.44	0.50

Intersection Summary

## Lanes, Volumes, Timings

2027 No-Build Weekday Evening Peak Hour

## 36: Minuteman Commuter Bikeway &amp; Lake Street

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	852	0	0	653	0	0	0	0	0	0	0
Future Volume (vph)	0	852	0	0	653	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	16	16	16	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	2049	0	0	2153	0	0	0	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	2049	0	0	2153	0	0	0	0	0	0	0
Right Turn on Red				Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		135			215			175			206	
Travel Time (s)		3.1			4.9			4.0			4.7	
Peak Hour Factor	0.84	0.84	0.84	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	1014	0	0	673	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1014	0	0	673	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.85	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2			2							
Detector Template		Thru			Thru							
Leading Detector (ft)		100			100							
Trailing Detector (ft)		0			0							
Detector 1 Position(ft)		0			0							
Detector 1 Size(ft)		6			6							
Detector 1 Type		Cl+Ex			Cl+Ex							
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0							
Detector 1 Queue (s)		0.0			0.0							
Detector 1 Delay (s)		0.0			0.0							
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA			NA							
Protected Phases		2			6							
Permitted Phases												
Detector Phase		2			6							

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

## Lanes, Volumes, Timings

2027 No-Build Weekday Evening Peak Hour

## 36: Minuteman Commuter Bikeway &amp; Lake Street

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Switch Phase</b>												
Minimum Initial (s)		4.0			4.0							
Minimum Split (s)		20.5			20.5							
Total Split (s)		47.0			47.0							
Total Split (%)		67.1%			67.1%							
Maximum Green (s)		42.5			42.5							
Yellow Time (s)		3.5			3.5							
All-Red Time (s)		1.0			1.0							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		4.5			4.5							
<b>Lead/Lag</b>												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0							
Recall Mode		C-Max			C-Max							
Walk Time (s)												
Flash Dont Walk (s)												
<b>Pedestrian Calls (#/hr)</b>												
Act Effect Green (s)		47.5			47.5							
Actuated g/C Ratio		0.68			0.68							
v/c Ratio		0.73			0.46							
Control Delay		11.1			6.8							
Queue Delay		51.0			1.7							
Total Delay		62.1			8.5							
LOS		E			A							
Approach Delay		62.1			8.5							
Approach LOS		E			A							

**Intersection Summary**

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 40.7

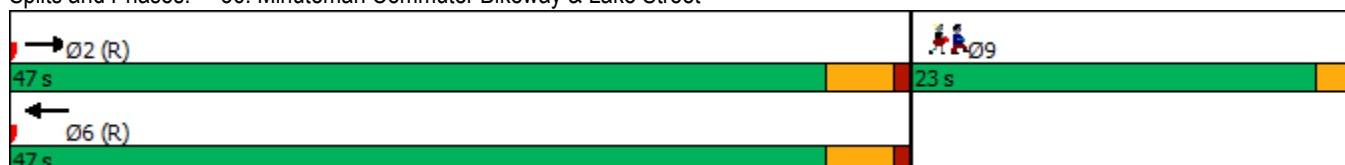
Intersection LOS: D

Intersection Capacity Utilization 48.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 36: Minuteman Commuter Bikeway &amp; Lake Street



Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	18.0
Total Split (s)	23.0
Total Split (%)	33%
Maximum Green (s)	21.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	211
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	



Lane Group	EBT	WBT
Lane Group Flow (vph)	1014	673
v/c Ratio	0.73	0.46
Control Delay	11.1	6.8
Queue Delay	51.0	1.7
Total Delay	62.1	8.5
Queue Length 50th (ft)	230	226
Queue Length 95th (ft)	312	169
Internal Link Dist (ft)	55	135
Turn Bay Length (ft)		
Base Capacity (vph)	1390	1460
Starvation Cap Reductn	0	585
Spillback Cap Reductn	655	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.38	0.77

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**Intersection Summary**

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Lanes, Volumes, Timings  
39: Brooks Avenue & Lake Street

2027 No-Build Weekday Evening Peak Hour  
01/14/2021

	↑	→	↓	↗	↖	↙	↖	↑	↗	↘	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	700	70	6	530	1	15	5	7	0	5	108
Future Volume (vph)	82	700	70	6	530	1	15	5	7	0	5	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	13	13	13	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												0.871
Flt Protected						0.999						0.973
Satd. Flow (prot)	0	1994	0	0	1961	0	0	1786	0	0	1655	0
Flt Permitted						0.991						0.635
Satd. Flow (perm)	0	1790	0	0	1946	0	0	1165	0	0	1655	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8						9				140
Link Speed (mph)		30			30			30				30
Link Distance (ft)		215			1126			206				208
Travel Time (s)		4.9			25.6			4.7				4.7
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.75	0.75	0.75	0.77	0.77	0.77
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	93	795	80	7	602	1	20	7	9	0	6	140
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	968	0	0	610	0	0	36	0	0	146	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		0			0			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	0.92	0.92	0.92	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru										
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex										
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA		Perm	NA		Perm	NA				NA
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

Lanes, Volumes, Timings  
39: Brooks Avenue & Lake Street

2027 No-Build Weekday Evening Peak Hour  
01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.5	20.5		20.5	20.5		14.0	14.0		14.0	14.0	
Total Split (s)	36.0	36.0		36.0	36.0		14.0	14.0		14.0	14.0	
Total Split (%)	51.4%	51.4%		51.4%	51.4%		20.0%	20.0%		20.0%	20.0%	
Maximum Green (s)	31.5	31.5		31.5	31.5		9.5	9.5		9.5	9.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0			0.0			0.0			0.0		
Total Lost Time (s)	4.5			4.5			4.5			4.5		
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		Min	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effect Green (s)	43.2			43.2			7.0			7.0		
Actuated g/C Ratio	0.62			0.62			0.10			0.10		
v/c Ratio	0.87			0.51			0.29			0.50		
Control Delay	26.5			12.2			29.2			12.8		
Queue Delay	47.9			0.6			0.0			0.2		
Total Delay	74.4			12.7			29.2			13.0		
LOS	E			B			C			B		
Approach Delay	74.4			12.7			29.2			13.0		
Approach LOS	E			B			C			B		

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 47.0

Intersection LOS: D

Intersection Capacity Utilization 93.3%

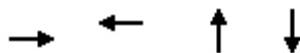
ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 39: Brooks Avenue & Lake Street



Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	18.0
Total Split (s)	20.0
Total Split (%)	29%
Maximum Green (s)	18.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	42
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	968	610	36	146
v/c Ratio	0.87	0.51	0.29	0.50
Control Delay	26.5	12.2	29.2	12.8
Queue Delay	47.9	0.6	0.0	0.2
Total Delay	74.4	12.7	29.2	13.0
Queue Length 50th (ft)	~274	171	11	2
Queue Length 95th (ft)	#672	284	29	33
Internal Link Dist (ft)	135	1046	126	128
Turn Bay Length (ft)				
Base Capacity (vph)	1107	1200	165	345
Starvation Cap Reductn	247	0	0	0
Spillback Cap Reductn	0	254	0	18
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.13	0.64	0.22	0.45

#### Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

2027 Build Weekday Morning Peak Hour

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	619	3	1	1202	5	1
Future Vol, veh/h	619	3	1	1202	5	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	87	87	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	825	4	1	1382	7	1
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	829	0	2211	827
Stage 1	-	-	-	-	827	-
Stage 2	-	-	-	-	1384	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	811	-	49	375
Stage 1	-	-	-	-	433	-
Stage 2	-	-	-	-	235	-
Platoon blocked, %	-	-	-	-		
Mov Cap-1 Maneuver	-	-	811	-	49	375
Mov Cap-2 Maneuver	-	-	-	-	49	-
Stage 1	-	-	-	-	433	-
Stage 2	-	-	-	-	234	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	78.2			
HCM LOS			F			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	57	-	-	811	-	
HCM Lane V/C Ratio	0.14	-	-	0.001	-	
HCM Control Delay (s)	78.2	-	-	9.4	0	
HCM Lane LOS	F	-	-	A	A	
HCM 95th %tile Q(veh)	0.5	-	-	0	-	

Intersection						
Int Delay, s/veh	4.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	606	14	5	1166	37	6
Future Vol, veh/h	606	14	5	1166	37	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	93	93	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	808	19	5	1254	49	8
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	827	0	2082	818
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	1264	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	813	-	59	379
Stage 1	-	-	-	-	437	-
Stage 2	-	-	-	-	268	-
Platoon blocked, %	-	-	-	-		
Mov Cap-1 Maneuver	-	-	813	-	58	379
Mov Cap-2 Maneuver	-	-	-	-	58	-
Stage 1	-	-	-	-	437	-
Stage 2	-	-	-	-	263	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	179			
HCM LOS			F			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	66	-	-	813	-	
HCM Lane V/C Ratio	0.869	-	-	0.007	-	
HCM Control Delay (s)	179	-	-	9.5	0	
HCM Lane LOS	F	-	-	A	A	
HCM 95th %tile Q(veh)	4.1	-	-	0	-	

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	602	607	3	1164	7	1
Future Vol, veh/h	602	607	3	1164	7	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	93	93	75	75
Heavy Vehicles, %	2	0	0	1	0	0
Mvmt Flow	803	809	3	1252	9	1
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	1612	0	2466	1208
Stage 1	-	-	-	-	1208	-
Stage 2	-	-	-	-	1258	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	410	-	34	225
Stage 1	-	-	-	-	286	-
Stage 2	-	-	-	-	270	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	410	-	33	225
Mov Cap-2 Maneuver	-	-	-	-	33	-
Stage 1	-	-	-	-	286	-
Stage 2	-	-	-	-	264	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	137.8			
HCM LOS			F			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	37	-	-	410	-	
HCM Lane V/C Ratio	0.288	-	-	0.008	-	
HCM Control Delay (s)	137.8	-	-	13.8	0	
HCM Lane LOS	F	-	-	B	A	
HCM 95th %tile Q(veh)	0.9	-	-	0	-	

## Intersection

Int Delay, s/veh 1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Lane Configurations</b>												
Traffic Vol, veh/h	0	590	18	8	1148	5	8	0	14	4	0	11
Future Vol, veh/h	0	590	18	8	1148	5	8	0	14	4	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	96	96	96	80	80	80	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0	0	0	10	0	0	0
Mvmt Flow	0	747	23	8	1196	5	10	0	18	4	0	12

Major/Minor	Major1	Major2		Minor1		Minor2		
Conflicting Flow All	1201	0	0	770	0	0	1980	1976
Stage 1	-	-	-	-	-	-	759	759
Stage 2	-	-	-	-	-	-	1221	1217
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4
Pot Cap-1 Maneuver	588	-	-	854	-	-	47	63
Stage 1	-	-	-	-	-	-	402	418
Stage 2	-	-	-	-	-	-	222	256
Platoon blocked, %	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	588	-	-	854	-	-	44	61
Mov Cap-2 Maneuver	-	-	-	-	-	-	44	61
Stage 1	-	-	-	-	-	-	402	418
Stage 2	-	-	-	-	-	-	204	249

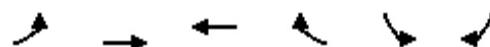
Approach	EB	WB		NB		SB	
HCM Control Delay, s	0	0.1		53.5		45	
HCM LOS				F		E	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	101	588	-	-	854	-	-	106
HCM Lane V/C Ratio	0.272	-	-	-	0.01	-	-	0.154
HCM Control Delay (s)	53.5	0	-	-	9.3	0	-	45
HCM Lane LOS	F	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	1	0	-	-	0	-	-	0.5

Intersection																		
Int Delay, s/veh 5.9																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations	+	+	+	+	+	+	+	+	+	+	+	+						
Traffic Vol, veh/h	3	593	12	26	1136	3	9	0	29	3	0	16						
Future Vol, veh/h	3	593	12	26	1136	3	9	0	29	3	0	16						
Conflicting Peds, #/hr	0	0	0	304	0	0	0	0	0	0	0	0						
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop						
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None						
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-						
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-						
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-						
Peak Hour Factor	84	84	84	97	97	97	75	75	75	75	75	75						
Heavy Vehicles, %	0	2	0	0	0	0	0	0	0	0	0	0						
Mvmt Flow	4	706	14	27	1171	3	12	0	39	4	0	21						
Major/Minor																		
Major1		Major2			Minor1		Minor2											
Conflicting Flow All	1174	0	0	1024	0	0	2262	2253	1017	1968	2259	1173						
Stage 1	-	-	-	-	-	-	1025	1025	-	1227	1227	-						
Stage 2	-	-	-	-	-	-	1237	1228	-	741	1032	-						
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2						
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-						
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-						
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3						
Pot Cap-1 Maneuver	602	-	-	686	-	-	29	42	291	48	42	236						
Stage 1	-	-	-	-	-	-	286	315	-	220	253	-						
Stage 2	-	-	-	-	-	-	217	253	-	411	313	-						
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-						
Mov Cap-1 Maneuver	602	-	-	512	-	-	17	26	217	35	26	236						
Mov Cap-2 Maneuver	-	-	-	-	-	-	17	26	-	35	26	-						
Stage 1	-	-	-	-	-	-	211	233	-	218	215	-						
Stage 2	-	-	-	-	-	-	167	215	-	334	231	-						
Approach																		
EB			WB			NB			SB									
HCM Control Delay, s	0.1		0.3		204.1			41.3										
HCM LOS	F						E											
Minor Lane/Major Mvmt																		
NBLn1		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1										
Capacity (veh/h)	57	602	-	-	512	-	-	124										
HCM Lane V/C Ratio	0.889	0.006	-	-	0.052	-	-	0.204										
HCM Control Delay (s)	204.1	11	0	-	12.4	0	-	41.3										
HCM Lane LOS	F	B	A	-	B	A	-	E										
HCM 95th %tile Q(veh)	4	0	-	-	0.2	-	-	0.7										

HCM Unsignalized Intersection Capacity Analysis  
17: Site Driveway/Dorothy Road & Littlejohn Street

2027 Build Weekday Morning Peak Hour  
01/04/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	7	7	30	19	0
Future Volume (Veh/h)	13	7	7	30	19	0
Sign Control	Stop	Stop			Free	
Grade	0%	0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	8	8	33	21	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	79	42	42	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	79	42	42	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	98	99	99	97	99	
cM capacity (veh/h)	872	843	843	1091	1636	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	22	41	21			
Volume Left	14	0	21			
Volume Right	0	33	0			
cSH	861	1032	1636			
Volume to Capacity	0.03	0.04	0.01			
Queue Length 95th (ft)	2	3	1			
Control Delay (s)	9.3	8.6	7.2			
Lane LOS	A	A	A			
Approach Delay (s)	9.3	8.6	7.2			
Approach LOS	A	A				
Intersection Summary						
Average Delay		8.5				
Intersection Capacity Utilization		17.8%		ICU Level of Service		A
Analysis Period (min)		15				



Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Lane Configurations	↑ ↗	↑ ↗	↑ ↗ ↘	↑ ↗	↖	↑ ↘	
Traffic Volume (vph)	261	295	851	609	403	454	
Future Volume (vph)	261	295	851	609	403	454	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	11	10	11	12	
Storage Length (ft)	0	100		55	150		
Storage Lanes	1	1		1	1		
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00	
Fr <sub>t</sub>		0.850		0.850			
Flt Protected	0.950				0.950		
Satd. Flow (prot)	2025	1812	3421	1492	1728	1863	
Flt Permitted	0.950				0.142		
Satd. Flow (perm)	2025	1812	3421	1492	258	1863	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		245		212			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1126		640			645	
Travel Time (s)	25.6		14.5			14.7	
Peak Hour Factor	0.91	0.91	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%	
Adj. Flow (vph)	287	324	925	662	438	493	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	287	324	925	662	438	493	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	16		11			11	
Link Offset(ft)	0		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.04	1.09	1.04	1.00	
Turning Speed (mph)	15	9		9	15		
Number of Detectors	1	1	2	1	1	2	
Detector Template	Left	Right	Thru	Right	Left	Thru	
Leading Detector (ft)	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	
Detector 1 Size(ft)	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)			94		94		
Detector 2 Size(ft)			6		6		
Detector 2 Type			Cl+Ex		Cl+Ex		
Detector 2 Channel							
Detector 2 Extend (s)			0.0		0.0		
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA	



Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Protected Phases	4		6		5	2	9
Permitted Phases			4		6	2	
Detector Phase	4	4	6	6	5	2	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0	23.0	23.0	23.0	10.0	23.0	19.0
Total Split (s)	29.0	29.0	38.0	38.0	15.0	53.0	23.0
Total Split (%)	27.6%	27.6%	36.2%	36.2%	14.3%	50.5%	22%
Maximum Green (s)	22.0	22.0	31.0	31.0	9.0	46.0	20.0
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	2.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.0	7.0	
Lead/Lag			Lag	Lag	Lead		
Lead-Lag Optimize?			Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max	None
Walk Time (s)							5.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							35
Act Effct Green (s)	17.2	17.2	31.8	31.8	48.2	47.2	
Actuated g/C Ratio	0.19	0.19	0.36	0.36	0.54	0.53	
v/c Ratio	0.73	0.59	0.76	0.99	1.50	0.50	
Control Delay	46.7	14.3	32.8	55.6	261.8	18.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	46.7	14.3	32.8	55.6	261.8	18.7	
LOS	D	B	C	E	F	B	
Approach Delay	29.5		42.3			133.1	
Approach LOS	C		D			F	

## Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 88.9

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.50

Intersection Signal Delay: 66.8

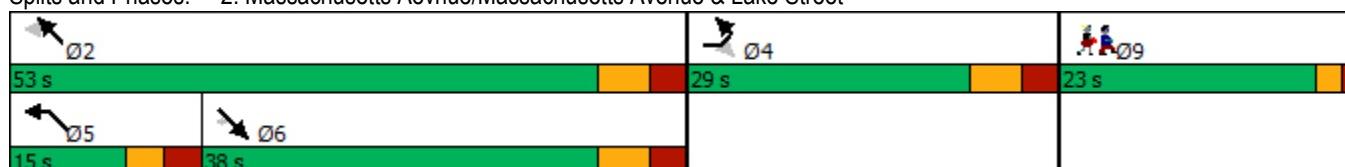
Intersection LOS: E

Intersection Capacity Utilization 77.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Massachusetts Avenue/Massachusetts Avenue &amp; Lake Street





Lane Group	EBL	EBR	SET	SER	NWL	NWT
Lane Group Flow (vph)	287	324	925	662	438	493
v/c Ratio	0.73	0.59	0.76	0.99	1.50	0.50
Control Delay	46.7	14.3	32.8	55.6	261.8	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.7	14.3	32.8	55.6	261.8	18.7
Queue Length 50th (ft)	170	42	282	~364	~339	214
Queue Length 95th (ft)	259	125	#409	#606	#554	332
Internal Link Dist (ft)	1046		560			565
Turn Bay Length (ft)		100		55	150	
Base Capacity (vph)	514	642	1224	669	292	989
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.50	0.76	0.99	1.50	0.50

**Intersection Summary**

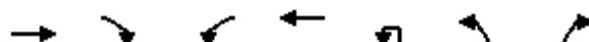
- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

## Lanes, Volumes, Timings

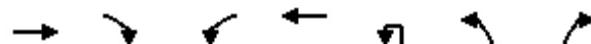
2027 Build Weekday Morning Peak Hour

## 5: Route 2 EB On/Off Ramps &amp; Lake Street

01/14/2021



Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Lane Configurations	↑	↑	↑	↑↑		↑	↑
Traffic Volume (vph)	312	493	212	421	271	221	523
Future Volume (vph)	312	493	212	421	271	221	523
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	10	11	12	16	14
Storage Length (ft)			150	110		0	0
Storage Lanes			1	1		1	1
Taper Length (ft)				25		25	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Fr <sub>t</sub>			0.850				0.850
Flt Protected				0.950			0.950
Satd. Flow (prot)	2132	1812	1685	3455	0	2037	1706
Flt Permitted				0.950			0.950
Satd. Flow (perm)	2132	1812	1685	3455	0	2037	1706
Right Turn on Red			Yes				Yes
Satd. Flow (RTOR)			332				405
Link Speed (mph)	30			30			30
Link Distance (ft)	239			505			387
Travel Time (s)	5.4			11.5			8.8
Peak Hour Factor	0.91	0.91	0.84	0.84	0.91	0.91	0.91
Heavy Vehicles (%)	1%	1%	0%	1%	0%	1%	1%
Adj. Flow (vph)	343	542	252	501	298	243	575
Shared Lane Traffic (%)							
Lane Group Flow (vph)	343	542	252	501	0	541	575
Enter Blocked Intersection	No						
Lane Alignment	Left	Right	Left	Left	R NA	Left	Right
Median Width(ft)	12			12			16
Link Offset(ft)	0			0			0
Crosswalk Width(ft)	16			16			16
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.09	1.04	1.00	0.85	0.92
Turning Speed (mph)		9	15		9	15	9
Number of Detectors	2	1	1	2	1	1	1
Detector Template	Thru	Right	Left	Thru	Left	Left	Right
Leading Detector (ft)	100	20	20	100	20	20	20
Trailing Detector (ft)	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20	20
Detector 1 Type	Cl+Ex						
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94			
Detector 2 Size(ft)	6			6			
Detector 2 Type	Cl+Ex			Cl+Ex			
Detector 2 Channel							
Detector 2 Extend (s)	0.0			0.0			
Turn Type	NA	Free	Prot	NA	Perm	Prot	Perm



Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Protected Phases	4		3	8		2	
Permitted Phases		Free			2		2
Detector Phase	4		3	8	2	2	2
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0		9.0	21.0	21.0	21.0	21.0
Total Split (s)	74.0		25.0	99.0	21.0	21.0	21.0
Total Split (%)	61.7%		20.8%	82.5%	17.5%	17.5%	17.5%
Maximum Green (s)	69.0		20.0	94.0	16.0	16.0	16.0
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max	Max
Walk Time (s)	5.0			5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0	0
Act Effct Green (s)	15.8	63.5	16.4	37.3		16.1	16.1
Actuated g/C Ratio	0.25	1.00	0.26	0.59		0.25	0.25
v/c Ratio	0.65	0.30	0.58	0.25		1.04	0.78
Control Delay	27.8	0.4	27.3	6.4		80.3	17.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	27.8	0.4	27.3	6.4		80.3	17.0
LOS	C	A	C	A		F	B
Approach Delay	11.0			13.4		47.7	
Approach LOS	B			B		D	

## Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 63.5

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 26.5

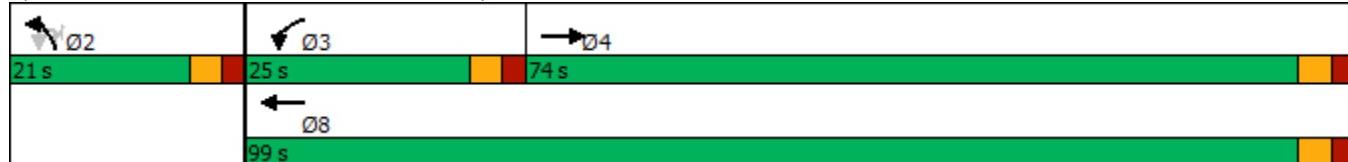
Intersection LOS: C

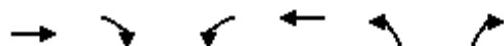
Intersection Capacity Utilization 67.9%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: Route 2 EB On/Off Ramps &amp; Lake Street





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	343	542	252	501	541	575
v/c Ratio	0.65	0.30	0.58	0.25	1.04	0.78
Control Delay	27.8	0.4	27.3	6.4	80.3	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.8	0.4	27.3	6.4	80.3	17.0
Queue Length 50th (ft)	119	0	84	43	~236	55
Queue Length 95th (ft)	205	0	152	57	#482	#246
Internal Link Dist (ft)	159			425	307	
Turn Bay Length (ft)		150	110			
Base Capacity (vph)	2110	1812	535	3455	518	735
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.30	0.47	0.15	1.04	0.78

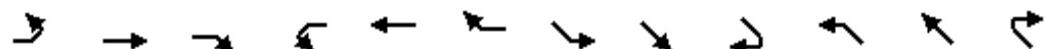
**Intersection Summary**

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Lanes, Volumes, Timings  
7: Route 2 WB Off Ramp & Lake Street

2027 Build Weekday Morning Peak Hour

01/14/2021

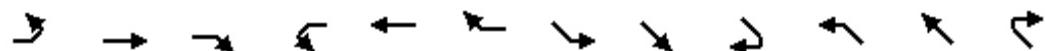


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	224	611	0	0	482	725	0	0	0	151	6	11
Future Volume (vph)	224	611	0	0	482	725	0	0	0	151	6	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	10	12	12	12	11	12	16
Storage Length (ft)	250			0	0	75	0		0	100		0
Storage Lanes	1			0	0	1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Fr <sub>t</sub>						0.850						0.850
Flt Protected	0.950									0.950	0.956	
Satd. Flow (prot)	1805	1881	0	0	1837	1492	0	0	0	1579	1594	1830
Flt Permitted	0.950									0.950	0.956	
Satd. Flow (perm)	1805	1881	0	0	1837	1492	0	0	0	1579	1594	1830
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						492						136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			380			459			529	
Travel Time (s)		11.5			8.6			10.4			12.0	
Peak Hour Factor	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.92	0.81	0.81	0.81
Heavy Vehicles (%)	0%	1%	0%	0%	0%	1%	0%	0%	0%	5%	50%	0%
Adj. Flow (vph)	255	694	0	0	524	788	0	0	0	186	7	14
Shared Lane Traffic (%)										48%		
Lane Group Flow (vph)	255	694	0	0	524	788	0	0	0	97	96	14
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.04	1.09	1.00	1.00	1.00	1.04	1.00	0.85
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2	1				1	2	1
Detector Template	Left	Thru			Thru	Right				Left	Thru	Right
Leading Detector (ft)	20	100			100	20				20	100	20
Trailing Detector (ft)	0	0			0	0				0	0	0
Detector 1 Position(ft)	0	0			0	0				0	0	0
Detector 1 Size(ft)	20	6			6	20				20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex				Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Prot	NA			NA	Perm				Split	NA	Perm

Lanes, Volumes, Timings  
7: Route 2 WB Off Ramp & Lake Street

2027 Build Weekday Morning Peak Hour

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Protected Phases	7	4			8					2	2	
Permitted Phases						8						2
Detector Phase	7	4			8	8				2	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Minimum Split (s)	8.5	22.0			22.0	22.0				22.0	22.0	22.0
Total Split (s)	16.0	38.0			22.0	22.0				22.0	22.0	22.0
Total Split (%)	26.7%	63.3%			36.7%	36.7%				36.7%	36.7%	36.7%
Maximum Green (s)	11.5	32.0			16.0	16.0				16.0	16.0	16.0
Yellow Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
All-Red Time (s)	0.5	2.0			2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0			6.0	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Recall Mode	None	None			None	None				Max	Max	Max
Walk Time (s)		5.0			5.0	5.0				5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0	11.0				11.0	11.0	11.0
Pedestrian Calls (#/hr)	0				0	0				0	0	0
Act Effct Green (s)	11.0	31.5			16.0	16.0				16.0	16.0	16.0
Actuated g/C Ratio	0.18	0.53			0.27	0.27				0.27	0.27	0.27
v/c Ratio	0.77	0.70			1.06	1.04				0.23	0.22	0.02
Control Delay	40.9	15.1			83.8	54.7				19.0	18.9	0.1
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	40.9	15.1			83.8	54.7				19.0	18.9	0.1
LOS	D	B			F	D				B	B	A
Approach Delay		22.0			66.3						17.7	
Approach LOS		C			E						B	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 59.5

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 45.2

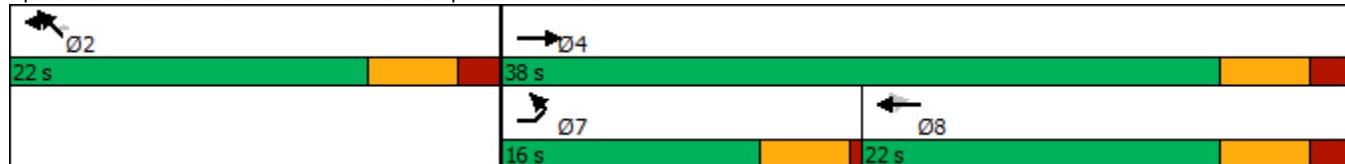
Intersection LOS: D

Intersection Capacity Utilization 75.4%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 7: Route 2 WB Off Ramp & Lake Street



## Queues

2027 Build Weekday Morning Peak Hour

## 7: Route 2 WB Off Ramp &amp; Lake Street

01/14/2021



Lane Group	EBL	EBT	WBT	WBR	NWL	NWT	NWR
Lane Group Flow (vph)	255	694	524	788	97	96	14
v/c Ratio	0.77	0.70	1.06	1.04	0.23	0.22	0.02
Control Delay	40.9	15.1	83.8	54.7	19.0	18.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	15.1	83.8	54.7	19.0	18.9	0.1
Queue Length 50th (ft)	88	168	~217	~169	28	28	0
Queue Length 95th (ft)	#179	268	#381	#364	56	55	0
Internal Link Dist (ft)			425	300		449	
Turn Bay Length (ft)	250			75	100		
Base Capacity (vph)	348	1012	494	760	425	429	591
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.69	1.06	1.04	0.23	0.22	0.02

## Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Lane Configurations			↑↑			↑↑		
Traffic Volume (vph)	0	0	1597	0	0	1062		
Future Volume (vph)	0	0	1597	0	0	1062		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.88		
Frt						0.850		
Flt Protected								
Satd. Flow (prot)	0	0	4729	0	0	2617		
Flt Permitted								
Satd. Flow (perm)	0	0	4729	0	0	2617		
Right Turn on Red				Yes		Yes		
Satd. Flow (RTOR)						7		
Link Speed (mph)		30	30		30			
Link Distance (ft)		201	192		296			
Travel Time (s)		4.6	4.4		6.7			
Peak Hour Factor	0.92	0.92	0.90	0.92	0.92	0.85		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	1%		
Adj. Flow (vph)	0	0	1774	0	0	1249		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	1774	0	0	1249		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		0	0		0			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	15			9	15	30		
Number of Detectors			2			1		
Detector Template			Thru		Right			
Leading Detector (ft)			100		20			
Trailing Detector (ft)			0		0			
Detector 1 Position(ft)			0		0			
Detector 1 Size(ft)			6		20			
Detector 1 Type			Cl+Ex		Cl+Ex			
Detector 1 Channel								
Detector 1 Extend (s)			0.0		0.0			
Detector 1 Queue (s)			0.0		0.0			
Detector 1 Delay (s)			0.0		0.0			
Detector 2 Position(ft)			94					
Detector 2 Size(ft)			6					
Detector 2 Type			Cl+Ex					
Detector 2 Channel								
Detector 2 Extend (s)			0.0					
Turn Type			NA		custom			
Protected Phases			2		3 4	3	4	
Permitted Phases								
Detector Phase			2		3 4			



Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
<b>Switch Phase</b>								
Minimum Initial (s)			10.0				10.0	10.0
Minimum Split (s)			15.0				19.0	15.0
Total Split (s)			58.0				36.0	26.0
Total Split (%)			48.3%				30%	22%
Maximum Green (s)			53.0				30.0	21.0
Yellow Time (s)			4.0				4.0	3.5
All-Red Time (s)			1.0				2.0	1.5
Lost Time Adjust (s)			0.0					
Total Lost Time (s)			5.0					
<b>Lead/Lag</b>							Lead	Lag
<b>Lead-Lag Optimize?</b>								
Vehicle Extension (s)			3.0				3.0	3.0
Recall Mode			C-Max				Max	Max
Walk Time (s)							5.0	
Flash Dont Walk (s)							8.0	
Pedestrian Calls (#/hr)							0	
Act Effect Green (s)			53.0				56.0	
Actuated g/C Ratio			0.44				0.47	
v/c Ratio			0.85				1.02	
Control Delay			5.6				62.8	
Queue Delay			4.6				0.0	
Total Delay			10.1				62.8	
LOS			B				E	
Approach Delay			10.1			62.8		
Approach LOS			B			E		

**Intersection Summary**

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 31.9

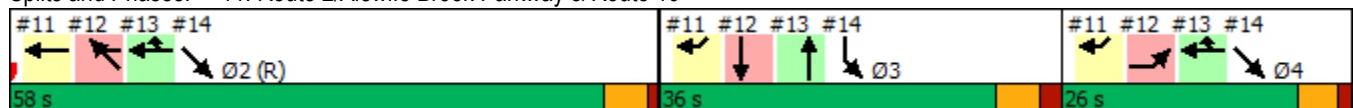
Intersection LOS: C

Intersection Capacity Utilization 84.7%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 11: Route 2/Alewife Brook Parkway &amp; Route 16





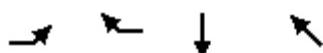
Lane Group	WBT	SWR
Lane Group Flow (vph)	1774	1249
v/c Ratio	0.85	1.02
Control Delay	5.6	62.8
Queue Delay	4.6	0.0
Total Delay	10.1	62.8
Queue Length 50th (ft)	43	~581
Queue Length 95th (ft)	m40	#659
Internal Link Dist (ft)	112	
Turn Bay Length (ft)		
Base Capacity (vph)	2088	1225
Starvation Cap Reductn	252	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.97	1.02

**Intersection Summary**

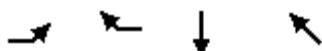
- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Lanes, Volumes, Timings  
12: Alewife Brook Parkway & Route 2

2027 Build Weekday Morning Peak Hour  
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Lane Group	EBL	WBR	SBT	NWT
Lane Configurations	↑↑	↑	↑↑	↑↑
Traffic Volume (vph)	505	169	506	1428
Future Volume (vph)	505	169	506	1428
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	13	16	13	13
Lane Util. Factor	0.97	1.00	0.95	0.95
Frt	0.865			
Flt Protected	0.950			
Satd. Flow (prot)	3224	1581	3291	3291
Flt Permitted	0.950			
Satd. Flow (perm)	3224	1581	3291	3291
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)		30	30	
Link Distance (ft)		202	278	
Travel Time (s)		4.6	6.3	
Peak Hour Factor	0.97	0.94	0.85	0.90
Heavy Vehicles (%)	1%	6%	2%	2%
Adj. Flow (vph)	521	180	595	1587
Shared Lane Traffic (%)				
Lane Group Flow (vph)	521	180	595	1587
Enter Blocked Intersection	No	No	No	No
Lane Alignment	Left	R NA	Left	L NA
Median Width(ft)		0	0	
Link Offset(ft)		0	0	
Crosswalk Width(ft)		16	16	
Two way Left Turn Lane				
Headway Factor	1.10	0.97	1.10	1.10
Turning Speed (mph)	15	30		
Number of Detectors	1	1	2	2
Detector Template	Left	Right	Thru	Thru
Leading Detector (ft)	20	20	100	100
Trailing Detector (ft)	0	0	0	0
Detector 1 Position(ft)	0	0	0	0
Detector 1 Size(ft)	20	20	6	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel				
Detector 1 Extend (s)	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94	94	
Detector 2 Size(ft)		6	6	
Detector 2 Type		Cl+Ex	Cl+Ex	
Detector 2 Channel				
Detector 2 Extend (s)		0.0	0.0	
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	2!	3	2!
Permitted Phases				
Detector Phase	4	2	3	2



Lane Group	EBL	WBR	SBT	NWT
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.0	15.0	19.0	15.0
Total Split (s)	26.0	58.0	36.0	58.0
Total Split (%)	21.7%	48.3%	30.0%	48.3%
Maximum Green (s)	21.0	53.0	30.0	53.0
Yellow Time (s)	3.5	4.0	4.0	4.0
All-Red Time (s)	1.5	1.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.0	5.0
Lead/Lag	Lag	Lead		
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	C-Max	Max	C-Max
Walk Time (s)			5.0	
Flash Dont Walk (s)			8.0	
Pedestrian Calls (#/hr)			0	
Act Effect Green (s)	21.0	53.0	30.0	53.0
Actuated g/C Ratio	0.18	0.44	0.25	0.44
v/c Ratio	0.92	0.26	0.72	1.09
Control Delay	72.2	14.3	47.1	85.8
Queue Delay	0.0	2.4	0.0	3.3
Total Delay	72.2	16.7	47.1	89.1
LOS	E	B	D	F
Approach Delay			47.1	89.1
Approach LOS			D	F

#### Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 72.8

Intersection LOS: E

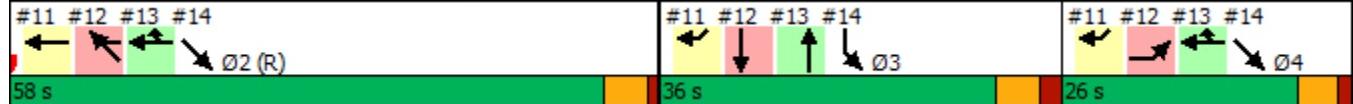
Intersection Capacity Utilization 103.7%

ICU Level of Service G

Analysis Period (min) 15

! Phase conflict between lane groups.

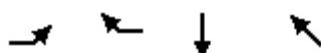
Splits and Phases: 12: Alewife Brook Parkway & Route 2



Queues  
12: Alewife Brook Parkway & Route 2

2027 Build Weekday Morning Peak Hour

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Lane Group	EBL	WBR	SBT	NWT
Lane Group Flow (vph)	521	180	595	1587
v/c Ratio	0.92	0.26	0.72	1.09
Control Delay	72.2	14.3	47.1	85.8
Queue Delay	0.0	2.4	0.0	3.3
Total Delay	72.2	16.7	47.1	89.1
Queue Length 50th (ft)	206	86	223	~730
Queue Length 95th (ft)	#308	138	269	#868
Internal Link Dist (ft)			122	198
Turn Bay Length (ft)				
Base Capacity (vph)	564	698	822	1453
Starvation Cap Reductn	0	397	0	0
Spillback Cap Reductn	0	6	0	13
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.92	0.60	0.72	1.10

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

## Lanes, Volumes, Timings

2027 Build Weekday Morning Peak Hour

13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	169	54	0	224	0	0	0	0
Future Volume (vph)	0	0	0	0	169	54	0	224	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0					200	0		0	0	0	0
Storage Lanes	0					1	0		0	0	0	0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt						0.850						
Flt Protected												
Satd. Flow (prot)	0	0	0	0	1613	1333	0	3154	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	1613	1333	0	3154	0	0	0	0
Right Turn on Red				No		No	No		No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		161			1225			227			185	
Travel Time (s)		3.7			27.8			5.2			4.2	
Confl. Peds. (#/hr)					2							
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	6%	9%	2%	3%	2%	2%	2%	2%
Adj. Flow (vph)	0	0	0	0	184	59	0	249	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	184	59	0	249	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	0				0			0			0	
Link Offset(ft)	0				0			0			0	
Crosswalk Width(ft)	16				16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors					2	1		2				
Detector Template						Thru	Right		Thru			
Leading Detector (ft)					100	20		100				
Trailing Detector (ft)					0	0		0				
Detector 1 Position(ft)					0	0		0				
Detector 1 Size(ft)					6	20		6				
Detector 1 Type					Cl+Ex	Cl+Ex		Cl+Ex				
Detector 1 Channel												
Detector 1 Extend (s)					0.0	0.0		0.0				
Detector 1 Queue (s)					0.0	0.0		0.0				
Detector 1 Delay (s)					0.0	0.0		0.0				
Detector 2 Position(ft)					94			94				
Detector 2 Size(ft)					6			6				
Detector 2 Type					Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				

Lane Group	Ø2	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		

## Lanes, Volumes, Timings

13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access

2027 Build Weekday Morning Peak Hour

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type					NA	Prot		NA				
Protected Phases					24	24			3			
Permitted Phases												
Detector Phase					24	24			3			
Switch Phase												
Minimum Initial (s)								10.0				
Minimum Split (s)								19.0				
Total Split (s)								36.0				
Total Split (%)								30.0%				
Maximum Green (s)								30.0				
Yellow Time (s)								4.0				
All-Red Time (s)								2.0				
Lost Time Adjust (s)								0.0				
Total Lost Time (s)								6.0				
Lead/Lag								Lead				
Lead-Lag Optimize?												
Vehicle Extension (s)								3.0				
Recall Mode								Max				
Walk Time (s)								5.0				
Flash Dont Walk (s)								8.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)					79.0	79.0		30.0				
Actuated g/C Ratio					0.66	0.66		0.25				
v/c Ratio					0.17	0.07		0.32				
Control Delay					8.4	7.6		38.0				
Queue Delay					0.1	0.0		0.0				
Total Delay					8.5	7.6		38.0				
LOS					A	A		D				
Approach Delay					8.3			38.0				
Approach LOS					A			D				

## Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 23.3

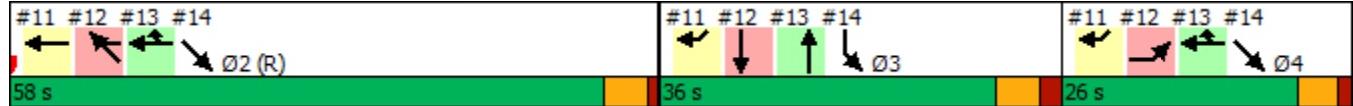
Intersection LOS: C

Intersection Capacity Utilization 27.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access



Lane Group	Ø2	Ø4
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	15.0	15.0
Total Split (s)	58.0	26.0
Total Split (%)	48%	22%
Maximum Green (s)	53.0	21.0
Yellow Time (s)	4.0	3.5
All-Red Time (s)	1.0	1.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	C-Max	Max
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

## Queues

2027 Build Weekday Morning Peak Hour

13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access

01/14/2021



Lane Group	WBT	WBR	NBT
Lane Group Flow (vph)	184	59	249
v/c Ratio	0.17	0.07	0.32
Control Delay	8.4	7.6	38.0
Queue Delay	0.1	0.0	0.0
Total Delay	8.5	7.6	38.0
Queue Length 50th (ft)	50	15	83
Queue Length 95th (ft)	81	31	121
Internal Link Dist (ft)	1145		147
Turn Bay Length (ft)		200	
Base Capacity (vph)	1061	877	788
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	223	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.22	0.07	0.32

Intersection Summary

Lanes, Volumes, Timings  
14: Alewife Brook Parkway & Route 2

2027 Build Weekday Morning Peak Hour

01/14/2021



Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Lane Configurations	↑↑			↑↑				
Traffic Volume (vph)	506	0	0	1104	0	0		
Future Volume (vph)	506	0	0	1104	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	1.00		
Frt								
Flt Protected	0.950							
Satd. Flow (prot)	3193	0	0	3324	0	0		
Flt Permitted	0.950							
Satd. Flow (perm)	3193	0	0	3324	0	0		
Right Turn on Red	Yes	Yes				Yes		
Satd. Flow (RTOR)	215							
Link Speed (mph)	30			30	30			
Link Distance (ft)	155			297	139			
Travel Time (s)	3.5			6.8	3.2			
Peak Hour Factor	0.85	0.92	0.92	0.97	0.92	0.92		
Heavy Vehicles (%)	2%	2%	2%	1%	2%	2%		
Adj. Flow (vph)	595	0	0	1138	0	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	595	0	0	1138	0	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Right	Left	Left	Left	Right		
Median Width(ft)	26			0	0			
Link Offset(ft)	0			0	0			
Crosswalk Width(ft)	16			16	16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	30	9	15			9		
Number of Detectors	1			2				
Detector Template	Left			Thru				
Leading Detector (ft)	20			100				
Trailing Detector (ft)	0			0				
Detector 1 Position(ft)	0			0				
Detector 1 Size(ft)	20			6				
Detector 1 Type	Cl+Ex			Cl+Ex				
Detector 1 Channel								
Detector 1 Extend (s)	0.0			0.0				
Detector 1 Queue (s)	0.0			0.0				
Detector 1 Delay (s)	0.0			0.0				
Detector 2 Position(ft)				94				
Detector 2 Size(ft)				6				
Detector 2 Type			Cl+Ex					
Detector 2 Channel								
Detector 2 Extend (s)				0.0				
Turn Type	Prot			NA				
Protected Phases	3			2 4		2	4	
Permitted Phases								
Detector Phase	3			2 4				

Lanes, Volumes, Timings  
14: Alewife Brook Parkway & Route 2

2027 Build Weekday Morning Peak Hour

01/14/2021



Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Switch Phase								
Minimum Initial (s)	10.0						10.0	10.0
Minimum Split (s)	19.0						15.0	15.0
Total Split (s)	36.0						58.0	26.0
Total Split (%)	30.0%						48%	22%
Maximum Green (s)	30.0						53.0	21.0
Yellow Time (s)	4.0						4.0	3.5
All-Red Time (s)	2.0						1.0	1.5
Lost Time Adjust (s)	0.0							
Total Lost Time (s)	6.0							
Lead/Lag	Lead						Lag	
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0						3.0	3.0
Recall Mode	Max						C-Max	Max
Walk Time (s)	5.0							
Flash Dont Walk (s)	8.0							
Pedestrian Calls (#/hr)	0							
Act Effect Green (s)	30.0				79.0			
Actuated g/C Ratio	0.25				0.66			
v/c Ratio	0.62				0.52			
Control Delay	2.8				11.7			
Queue Delay	1.0				0.0			
Total Delay	3.7				11.7			
LOS	A				B			
Approach Delay	3.7				11.7			
Approach LOS	A				B			

Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 9.0

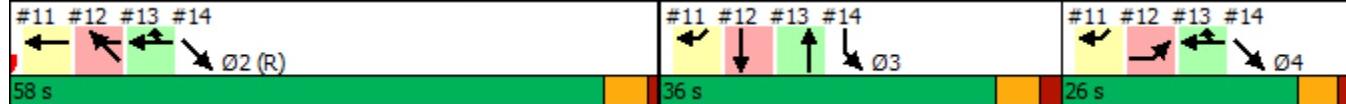
Intersection LOS: A

Intersection Capacity Utilization 59.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 14: Alewife Brook Parkway & Route 2



Queues  
14: Alewife Brook Parkway & Route 2

2027 Build Weekday Morning Peak Hour

01/14/2021



Lane Group	SBL	SET
Lane Group Flow (vph)	595	1138
v/c Ratio	0.62	0.52
Control Delay	2.8	11.7
Queue Delay	1.0	0.0
Total Delay	3.7	11.7
Queue Length 50th (ft)	5	221
Queue Length 95th (ft)	0	272
Internal Link Dist (ft)	75	217
Turn Bay Length (ft)		
Base Capacity (vph)	959	2188
Starvation Cap Reductn	155	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.74	0.52
Intersection Summary		

## Lanes, Volumes, Timings

## 36: Minuteman Commuter Bikeway &amp; Lake Street

2027 Build Weekday Morning Peak Hour

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	625	0	0	1165	0	0	0	0	0	0	0
Future Volume (vph)	0	625	0	0	1165	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	16	16	16	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	2049	0	0	2153	0	0	0	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	2049	0	0	2153	0	0	0	0	0	0	0
Right Turn on Red				Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		135			215			175			206	
Travel Time (s)		3.1			4.9			4.0			4.7	
Peak Hour Factor	0.84	0.84	0.84	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	744	0	0	1201	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	744	0	0	1201	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.85	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2			2							
Detector Template		Thru			Thru							
Leading Detector (ft)		100			100							
Trailing Detector (ft)		0			0							
Detector 1 Position(ft)		0			0							
Detector 1 Size(ft)		6			6							
Detector 1 Type		Cl+Ex			Cl+Ex							
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0							
Detector 1 Queue (s)		0.0			0.0							
Detector 1 Delay (s)		0.0			0.0							
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA			NA							
Protected Phases		2			6							
Permitted Phases												
Detector Phase		2			6							

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

## Lanes, Volumes, Timings

36: Minuteman Commuter Bikeway &amp; Lake Street

2027 Build Weekday Morning Peak Hour

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Switch Phase</b>												
Minimum Initial (s)		4.0			4.0							
Minimum Split (s)		20.5			20.5							
Total Split (s)		47.0			47.0							
Total Split (%)		67.1%			67.1%							
Maximum Green (s)		42.5			42.5							
Yellow Time (s)		3.5			3.5							
All-Red Time (s)		1.0			1.0							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		4.5			4.5							
<b>Lead/Lag</b>												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0							
Recall Mode		C-Max			C-Max							
Walk Time (s)												
Flash Dont Walk (s)												
<b>Pedestrian Calls (#/hr)</b>												
Act Effect Green (s)		47.5			47.5							
Actuated g/C Ratio		0.68			0.68							
v/c Ratio		0.54			0.82							
Control Delay		7.4			17.3							
Queue Delay		53.2			50.3							
Total Delay		60.6			67.7							
LOS		E			E							
Approach Delay		60.6			67.7							
Approach LOS		E			E							

**Intersection Summary**

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 65.0

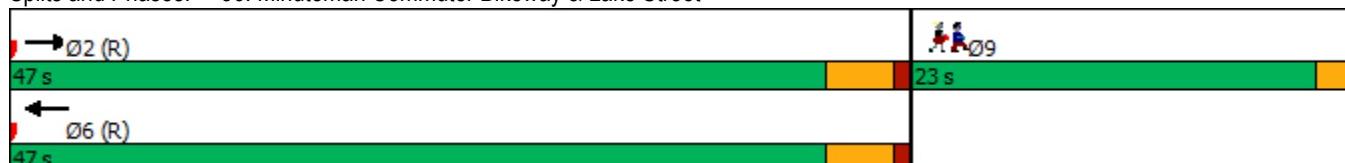
Intersection LOS: E

Intersection Capacity Utilization 65.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 36: Minuteman Commuter Bikeway &amp; Lake Street



Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	18.0
Total Split (s)	23.0
Total Split (%)	33%
Maximum Green (s)	21.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	311
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	



Lane Group	EBT	WBT
Lane Group Flow (vph)	744	1201
v/c Ratio	0.54	0.82
Control Delay	7.4	17.3
Queue Delay	53.2	50.3
Total Delay	60.6	67.7
Queue Length 50th (ft)	134	570
Queue Length 95th (ft)	182	m580
Internal Link Dist (ft)	55	135
Turn Bay Length (ft)		
Base Capacity (vph)	1390	1460
Starvation Cap Reductn	0	729
Spillback Cap Reductn	812	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.29	1.64

**Intersection Summary**

m Volume for 95th percentile queue is metered by upstream signal.

Lanes, Volumes, Timings  
39: Brooks Avenue & Lake Street

2027 Build Weekday Morning Peak Hour  
01/14/2021

	↑	→	↓	↗	↖	↙	↖	↑	↗	↙	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	548	46	6	1006	0	38	4	5	3	7	121
Future Volume (vph)	31	548	46	6	1006	0	38	4	5	3	7	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	13	13	13	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990						0.985			0.875	
Flt Protected		0.998						0.961			0.999	
Satd. Flow (prot)	0	1978	0	0	1944	0	0	1799	0	0	1661	0
Flt Permitted		0.919			0.997			0.487			0.993	
Satd. Flow (perm)	0	1821	0	0	1938	0	0	911	0	0	1651	0
Right Turn on Red		Yes				Yes			Yes			Yes
Satd. Flow (RTOR)		6						7			155	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		215			1126			206			208	
Travel Time (s)		4.9			25.6			4.7			4.7	
Peak Hour Factor	0.91	0.91	0.91	0.87	0.87	0.87	0.75	0.75	0.75	0.78	0.78	0.78
Heavy Vehicles (%)	0%	1%	5%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	34	602	51	7	1156	0	51	5	7	4	9	155
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	687	0	0	1163	0	0	63	0	0	168	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.92	0.92	0.92	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru										
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex										
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		3	8		4	4	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

Lanes, Volumes, Timings  
39: Brooks Avenue & Lake Street

2027 Build Weekday Morning Peak Hour  
01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.5	20.5		20.5	20.5		8.5	14.0		13.0	13.0	
Total Split (s)	27.0	27.0		27.0	27.0		10.0	23.0		13.0	13.0	
Total Split (%)	38.6%	38.6%		38.6%	38.6%		14.3%	32.9%		18.6%	18.6%	
Maximum Green (s)	22.5	22.5		22.5	22.5		5.5	18.5		8.5	8.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		4.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		0.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0			0.0			0.0			0.0		
Total Lost Time (s)	4.5			4.5			4.5			4.5		
Lead/Lag							Lead			Lag		Lag
Lead-Lag Optimize?							Yes			Yes		Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effect Green (s)	40.9			40.9			9.3			9.3		
Actuated g/C Ratio	0.58			0.58			0.13			0.13		
v/c Ratio	0.64			1.03			0.50			0.48		
Control Delay	23.5			56.5			38.1			10.7		
Queue Delay	33.2			30.6			0.0			0.4		
Total Delay	56.7			87.1			38.1			11.2		
LOS	E			F			D			B		
Approach Delay	56.7			87.1			38.1			11.2		
Approach LOS	E			F			D			B		

#### Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 69.4

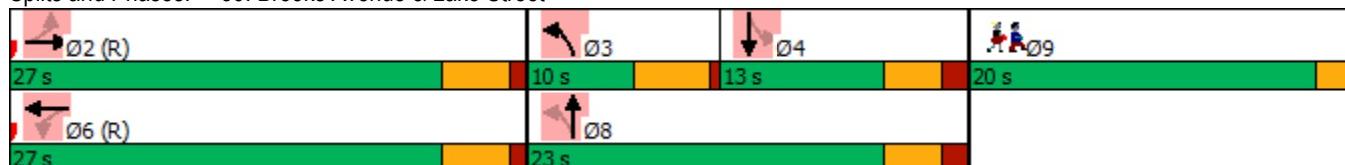
Intersection LOS: E

Intersection Capacity Utilization 77.5%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 39: Brooks Avenue & Lake Street

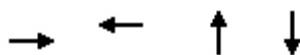


Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	18.0
Total Split (s)	20.0
Total Split (%)	29%
Maximum Green (s)	18.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	52
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Queues  
39: Brooks Avenue & Lake Street

2027 Build Weekday Morning Peak Hour

01/14/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	687	1163	63	168
V/c Ratio	0.64	1.03	0.50	0.48
Control Delay	23.5	56.5	38.1	10.7
Queue Delay	33.2	30.6	0.0	0.4
Total Delay	56.7	87.1	38.1	11.2
Queue Length 50th (ft)	249	~636	23	5
Queue Length 95th (ft)	#448	#879	44	35
Internal Link Dist (ft)	135	1046	126	128
Turn Bay Length (ft)				
Base Capacity (vph)	1066	1132	245	372
Starvation Cap Reductn	412	0	0	0
Spillback Cap Reductn	0	482	1	38
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.05	1.79	0.26	0.50

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

2027 Build Weekday Evening Peak Hour

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	844	3	1	610	9	4
Future Vol, veh/h	844	3	1	610	9	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	94	94	75	75
Heavy Vehicles, %	0	0	0	0	29	0
Mvmt Flow	1017	4	1	649	12	5
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	1021	0	1670	1019
Stage 1	-	-	-	-	1019	-
Stage 2	-	-	-	-	651	-
Critical Hdwy	-	-	4.1	-	6.69	6.2
Critical Hdwy Stg 1	-	-	-	-	5.69	-
Critical Hdwy Stg 2	-	-	-	-	5.69	-
Follow-up Hdwy	-	-	2.2	-	3.761	3.3
Pot Cap-1 Maneuver	-	-	688	-	91	290
Stage 1	-	-	-	-	311	-
Stage 2	-	-	-	-	472	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	688	-	91	290
Mov Cap-2 Maneuver	-	-	-	-	91	-
Stage 1	-	-	-	-	311	-
Stage 2	-	-	-	-	471	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	41.8			
HCM LOS			E			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	115	-	-	688	-	
HCM Lane V/C Ratio	0.151	-	-	0.002	-	
HCM Control Delay (s)	41.8	-	-	10.2	0	
HCM Lane LOS	E	-	-	B	A	
HCM 95th %tile Q(veh)	0.5	-	-	0	-	

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↔	↔		
Traffic Vol, veh/h	842	6	9	588	23	5
Future Vol, veh/h	842	6	9	588	23	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	89	89	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	968	7	10	661	31	7
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	975	0	1653	972
Stage 1	-	-	-	-	972	-
Stage 2	-	-	-	-	681	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	716	-	109	309
Stage 1	-	-	-	-	370	-
Stage 2	-	-	-	-	506	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	716	-	107	309
Mov Cap-2 Maneuver	-	-	-	-	107	-
Stage 1	-	-	-	-	370	-
Stage 2	-	-	-	-	495	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.2	47.5			
HCM LOS			E			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	121	-	-	716	-	
HCM Lane V/C Ratio	0.309	-	-	0.014	-	
HCM Control Delay (s)	47.5	-	-	10.1	0	
HCM Lane LOS	E	-	-	B	A	
HCM 95th %tile Q(veh)	1.2	-	-	0	-	

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↓	↔		
Traffic Vol, veh/h	846	1	1	591	6	4
Future Vol, veh/h	846	1	1	591	6	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	89	89	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	972	1	1	664	8	5
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	973	0	1639	973
Stage 1	-	-	-	-	973	-
Stage 2	-	-	-	-	666	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	717	-	112	309
Stage 1	-	-	-	-	370	-
Stage 2	-	-	-	-	515	-
Platoon blocked, %	-	-	-	-		
Mov Cap-1 Maneuver	-	-	717	-	112	309
Mov Cap-2 Maneuver	-	-	-	-	112	-
Stage 1	-	-	-	-	370	-
Stage 2	-	-	-	-	514	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0	31.3			
HCM LOS			D			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	150	-	-	717	-	
HCM Lane V/C Ratio	0.089	-	-	0.002	-	
HCM Control Delay (s)	31.3	-	-	10	0	
HCM Lane LOS	D	-	-	B	A	
HCM 95th %tile Q(veh)	0.3	-	-	0	-	

## Intersection

Int Delay, s/veh 1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Lane Configurations</b>												
Traffic Vol, veh/h	4	827	19	11	578	8	13	1	6	3	0	1
Future Vol, veh/h	4	827	19	11	578	8	13	1	6	3	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	962	22	13	672	9	17	1	8	4	0	1

Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	681	0	0	984	0	0	1686	1690	973	1691	1697	677
Stage 1	-	-	-	-	-	-	983	983	-	703	703	-
Stage 2	-	-	-	-	-	-	703	707	-	988	994	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	921	-	-	710	-	-	75	94	309	75	93	456
Stage 1	-	-	-	-	-	-	302	329	-	431	443	-
Stage 2	-	-	-	-	-	-	431	441	-	300	326	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	921	-	-	710	-	-	72	90	309	70	89	456
Mov Cap-2 Maneuver	-	-	-	-	-	-	72	90	-	70	89	-
Stage 1	-	-	-	-	-	-	298	325	-	426	430	-
Stage 2	-	-	-	-	-	-	417	428	-	288	322	-

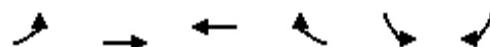
Approach	EB	WB		NB		SB	
HCM Control Delay, s	0	0.2		57.1		48	
HCM LOS				F		E	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	95	921	-	-	710	-	-	89
HCM Lane V/C Ratio	0.281	0.005	-	-	0.018	-	-	0.06
HCM Control Delay (s)	57.1	8.9	0	-	10.2	0	-	48
HCM Lane LOS	F	A	A	-	B	A	-	E
HCM 95th %tile Q(veh)	1	0	-	-	0.1	-	-	0.2

Intersection												
Int Delay, s/veh	10											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	+	+	+	+	+	+	+	+	+	+	+	+
Traffic Vol, veh/h	19	800	17	67	577	16	9	0	48	9	0	11
Future Vol, veh/h	19	800	17	67	577	16	9	0	48	9	0	11
Conflicting Peds, #/hr	0	0	0	304	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	88	88	88	81	81	81	80	80	80
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	23	964	20	76	656	18	11	0	59	11	0	14
Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	674	0	0	1288	0	0	2148	2150	1278	1867	2151	665
Stage 1	-	-	-	-	-	-	1324	1324	-	817	817	-
Stage 2	-	-	-	-	-	-	824	826	-	1050	1334	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	927	-	-	545	-	-	35	49	205	56	49	464
Stage 1	-	-	-	-	-	-	194	227	-	373	393	-
Stage 2	-	-	-	-	-	-	370	389	-	277	225	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	927	-	-	407	-	-	19	24	153	25	24	464
Mov Cap-2 Maneuver	-	-	-	-	-	-	19	24	-	25	24	-
Stage 1	-	-	-	-	-	-	137	160	-	352	275	-
Stage 2	-	-	-	-	-	-	252	273	-	160	159	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	0.2		1.6		198.3		126.6					
HCM LOS					F		F					
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	72	927	-	-	407	-	-	52				
HCM Lane V/C Ratio	0.977	0.025	-	-	0.187	-	-	0.481				
HCM Control Delay (s)	198.3	9	0	-	15.9	0	-	126.6				
HCM Lane LOS	F	A	A	-	C	A	-	F				
HCM 95th %tile Q(veh)	5	0.1	-	-	0.7	-	-	1.8				

HCM Unsignalized Intersection Capacity Analysis  
17: Site Driveway/Dorothy Road & Littlejohn Street

2027 Build Weekday Evening Peak Hour  
01/04/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	5	20	20	15	0
Future Volume (Veh/h)	8	5	20	20	15	0
Sign Control	Stop	Stop			Free	
Grade	0%	0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	5	22	22	16	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	65	32	32	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	65	32	32	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	99	99	97	98	99	
cM capacity (veh/h)	890	856	856	1091	1636	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	14	44	16			
Volume Left	9	0	16			
Volume Right	0	22	0			
cSH	878	959	1636			
Volume to Capacity	0.02	0.05	0.01			
Queue Length 95th (ft)	1	4	1			
Control Delay (s)	9.2	8.9	7.2			
Lane LOS	A	A	A			
Approach Delay (s)	9.2	8.9	7.2			
Approach LOS	A	A				
Intersection Summary						
Average Delay		8.6				
Intersection Capacity Utilization		17.4%		ICU Level of Service		A
Analysis Period (min)		15				



Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Lane Configurations	↑ ↗	↑ ↗	↑ ↗ ↘	↑ ↗	↑ ↙	↑ ↙	
Traffic Volume (vph)	432	280	658	192	352	739	
Future Volume (vph)	432	280	658	192	352	739	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	16	16	11	10	11	12	
Storage Length (ft)	0	100		55	150		
Storage Lanes	1	1		1	1		
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00	
Fr <sub>t</sub>		0.850		0.850			
Flt Protected	0.950				0.950		
Satd. Flow (prot)	2046	1830	3421	1507	1745	1863	
Flt Permitted	0.950				0.220		
Satd. Flow (perm)	2046	1830	3421	1507	404	1863	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		140		87			
Link Speed (mph)	30		30			30	
Link Distance (ft)	1126		640			645	
Travel Time (s)	25.6		14.5			14.7	
Peak Hour Factor	0.88	0.88	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%	
Adj. Flow (vph)	491	318	715	209	383	803	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	491	318	715	209	383	803	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	16		11			11	
Link Offset(ft)	0		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.04	1.09	1.04	1.00	
Turning Speed (mph)	15	9		9	15		
Number of Detectors	1	1	2	1	1	2	
Detector Template	Left	Right	Thru	Right	Left	Thru	
Leading Detector (ft)	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	
Detector 1 Size(ft)	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)			94		94		
Detector 2 Size(ft)			6		6		
Detector 2 Type			Cl+Ex		Cl+Ex		
Detector 2 Channel							
Detector 2 Extend (s)			0.0		0.0		
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA	



Lane Group	EBL	EBR	SET	SER	NWL	NWT	Ø9
Protected Phases	4		6		5	2	9
Permitted Phases			4		6	2	
Detector Phase	4	4	6	6	5	2	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0	23.0	23.0	23.0	10.0	23.0	19.0
Total Split (s)	29.0	29.0	38.0	38.0	15.0	53.0	23.0
Total Split (%)	27.6%	27.6%	36.2%	36.2%	14.3%	50.5%	22%
Maximum Green (s)	22.0	22.0	31.0	31.0	9.0	46.0	20.0
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	2.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	7.0	6.0	7.0	
Lead/Lag			Lag	Lag	Lead		
Lead-Lag Optimize?			Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max	None
Walk Time (s)							5.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							35
Act Effct Green (s)	22.2	22.2	31.3	31.3	47.5	46.5	
Actuated g/C Ratio	0.24	0.24	0.34	0.34	0.51	0.50	
v/c Ratio	1.01	0.59	0.62	0.37	1.14	0.87	
Control Delay	81.8	23.6	30.4	17.2	116.1	34.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	81.8	23.6	30.4	17.2	116.1	34.8	
LOS	F	C	C	B	F	C	
Approach Delay	58.9		27.4			61.1	
Approach LOS	E		C			E	

## Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 93.4

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 49.8

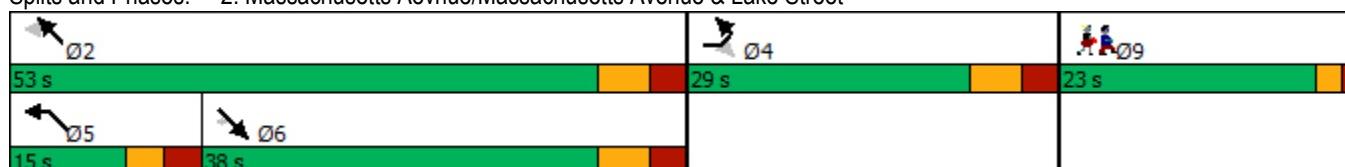
Intersection LOS: D

Intersection Capacity Utilization 78.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Massachusetts Avenue/Massachusetts Avenue &amp; Lake Street





Lane Group	EBL	EBR	SET	SER	NWL	NWT
Lane Group Flow (vph)	491	318	715	209	383	803
v/c Ratio	1.01	0.59	0.62	0.37	1.14	0.87
Control Delay	81.8	23.6	30.4	17.2	116.1	34.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.8	23.6	30.4	17.2	116.1	34.8
Queue Length 50th (ft)	~362	102	211	59	~224	480
Queue Length 95th (ft)	#541	188	277	124	#433	#740
Internal Link Dist (ft)	1046		560			565
Turn Bay Length (ft)		100		55	150	
Base Capacity (vph)	486	542	1147	562	335	927
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.59	0.62	0.37	1.14	0.87

**Intersection Summary**

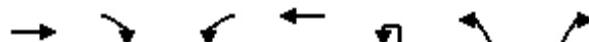
- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

## Lanes, Volumes, Timings

2027 Build Weekday Evening Peak Hour

## 5: Route 2 EB On/Off Ramps &amp; Lake Street

01/14/2021



Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Lane Configurations	↑	↗	↖	↑↑		↘	↗
Traffic Volume (vph)	547	181	172	303	14	531	641
Future Volume (vph)	547	181	172	303	14	531	641
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	10	11	12	16	14
Storage Length (ft)		150	110			0	0
Storage Lanes		1	1			1	1
Taper Length (ft)			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Fr <sub>t</sub>		0.850				0.850	
Flt Protected			0.950			0.950	
Satd. Flow (prot)	2153	1664	1652	3490	0	2046	1723
Flt Permitted			0.950			0.950	
Satd. Flow (perm)	2153	1664	1652	3490	0	2046	1723
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		70				448	
Link Speed (mph)	30		30		30		
Link Distance (ft)	239		505		387		
Travel Time (s)	5.4		11.5		8.8		
Peak Hour Factor	0.94	0.94	0.87	0.87	0.96	0.96	0.96
Heavy Vehicles (%)	0%	10%	2%	0%	0%	0%	0%
Adj. Flow (vph)	582	193	198	348	15	553	668
Shared Lane Traffic (%)							
Lane Group Flow (vph)	582	193	198	348	0	568	668
Enter Blocked Intersection	No						
Lane Alignment	Left	Right	Left	Left	R NA	Left	Right
Median Width(ft)	12		12		16		
Link Offset(ft)	0		0		0		
Crosswalk Width(ft)	16		16		16		
Two way Left Turn Lane							
Headway Factor	0.85	0.85	1.09	1.04	1.00	0.85	0.92
Turning Speed (mph)		9	15		9	15	9
Number of Detectors	2	1	1	2	1	1	1
Detector Template	Thru	Right	Left	Thru	Left	Left	Right
Leading Detector (ft)	100	20	20	100	20	20	20
Trailing Detector (ft)	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20	20
Detector 1 Type	Cl+Ex						
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94		94				
Detector 2 Size(ft)	6		6				
Detector 2 Type	Cl+Ex		Cl+Ex				
Detector 2 Channel							
Detector 2 Extend (s)	0.0		0.0				
Turn Type	NA	Free	Prot	NA	Perm	Prot	Perm



Lane Group	EBT	EBR	WBL	WBT	NBU	NBL	NBR
Protected Phases	4		3	8		2	
Permitted Phases		Free			2		2
Detector Phase	4		3	8	2	2	2
Switch Phase							
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0		9.0	21.0	21.0	21.0	21.0
Total Split (s)	74.0		25.0	99.0	21.0	21.0	21.0
Total Split (%)	61.7%		20.8%	82.5%	17.5%	17.5%	17.5%
Maximum Green (s)	69.0		20.0	94.0	16.0	16.0	16.0
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max	Max
Walk Time (s)	5.0			5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0	0
Act Effct Green (s)	25.8	71.6	14.1	45.0		16.3	16.3
Actuated g/C Ratio	0.36	1.00	0.20	0.63		0.23	0.23
v/c Ratio	0.75	0.12	0.61	0.16		1.22	0.90
Control Delay	27.0	0.1	36.2	5.3		145.5	28.7
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	27.0	0.1	36.2	5.3		145.5	28.7
LOS	C	A	D	A		F	C
Approach Delay	20.3			16.5		82.4	
Approach LOS	C			B		F	

## Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 71.6

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.22

Intersection Signal Delay: 49.5

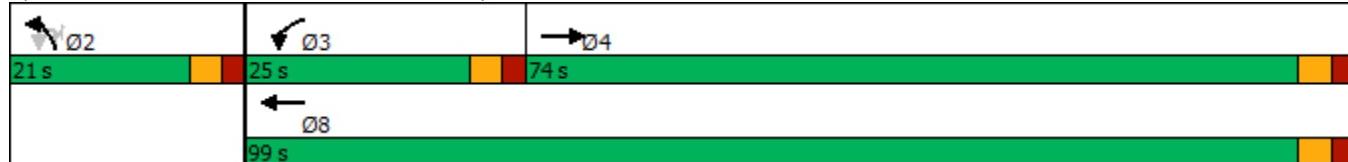
Intersection LOS: D

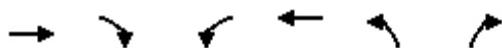
Intersection Capacity Utilization 81.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 5: Route 2 EB On/Off Ramps &amp; Lake Street





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	582	193	198	348	568	668
V/c Ratio	0.75	0.12	0.61	0.16	1.22	0.90
Control Delay	27.0	0.1	36.2	5.3	145.5	28.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	0.1	36.2	5.3	145.5	28.7
Queue Length 50th (ft)	216	0	80	28	~316	93
Queue Length 95th (ft)	362	0	157	40	#635	#368
Internal Link Dist (ft)	159			425	307	
Turn Bay Length (ft)		150	110			
Base Capacity (vph)	1999	1664	471	3490	467	739
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.12	0.42	0.10	1.22	0.90

**Intersection Summary**

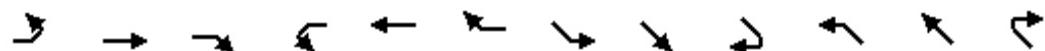
- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

## Lanes, Volumes, Timings

## 7: Route 2 WB Off Ramp &amp; Lake Street

2027 Build Weekday Evening Peak Hour

01/14/2021

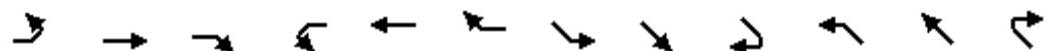


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	368	820	0	0	267	352	0	0	0	208	22	27
Future Volume (vph)	368	820	0	0	267	352	0	0	0	208	22	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	10	12	12	12	11	12	16
Storage Length (ft)	250				0	0	75	0	0	100		0
Storage Lanes	1				0	0	1	0	0	1		1
Taper Length (ft)	25				25		25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Fr <sub>t</sub>						0.850						0.850
Flt Protected	0.950									0.950	0.961	
Satd. Flow (prot)	1805	1881	0	0	1801	1463	0	0	0	1641	1705	1830
Flt Permitted	0.950									0.950	0.961	
Satd. Flow (perm)	1805	1881	0	0	1801	1463	0	0	0	1641	1705	1830
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						387						136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			380			459			529	
Travel Time (s)		11.5			8.6			10.4			12.0	
Peak Hour Factor	0.88	0.88	0.88	0.91	0.91	0.91	0.92	0.92	0.92	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	0%	0%	2%	3%	0%	0%	0%	1%	5%	0%
Adj. Flow (vph)	418	932	0	0	293	387	0	0	0	219	23	28
Shared Lane Traffic (%)										45%		
Lane Group Flow (vph)	418	932	0	0	293	387	0	0	0	120	122	28
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.04	1.09	1.00	1.00	1.00	1.04	1.00	0.85
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2	1				1	2	1
Detector Template	Left	Thru			Thru	Right				Left	Thru	Right
Leading Detector (ft)	20	100			100	20				20	100	20
Trailing Detector (ft)	0	0			0	0				0	0	0
Detector 1 Position(ft)	0	0			0	0				0	0	0
Detector 1 Size(ft)	20	6			6	20				20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex				Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Prot	NA			NA	Perm				Split	NA	Perm

Lanes, Volumes, Timings  
7: Route 2 WB Off Ramp & Lake Street

2027 Build Weekday Evening Peak Hour

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Protected Phases	7	4			8					2	2	
Permitted Phases						8						2
Detector Phase	7	4			8	8				2	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Minimum Split (s)	8.5	22.0			22.0	22.0				22.0	22.0	22.0
Total Split (s)	16.0	38.0			22.0	22.0				22.0	22.0	22.0
Total Split (%)	26.7%	63.3%			36.7%	36.7%				36.7%	36.7%	36.7%
Maximum Green (s)	11.5	32.0			16.0	16.0				16.0	16.0	16.0
Yellow Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
All-Red Time (s)	0.5	2.0			2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0			6.0	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Recall Mode	None	None			None	None				Max	Max	Max
Walk Time (s)		5.0			5.0	5.0				5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0	11.0				11.0	11.0	11.0
Pedestrian Calls (#/hr)	0				0	0				0	0	0
Act Effct Green (s)	11.5	31.0			14.9	14.9				16.0	16.0	16.0
Actuated g/C Ratio	0.19	0.53			0.25	0.25				0.27	0.27	0.27
v/c Ratio	1.19	0.94			0.64	0.59				0.27	0.26	0.05
Control Delay	137.1	33.8			26.9	6.5				19.4	19.3	0.1
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	137.1	33.8			26.9	6.5				19.4	19.3	0.1
LOS	F	C			C	A				B	B	A
Approach Delay		65.8			15.3						17.4	
Approach LOS		E			B						B	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 59

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 45.2

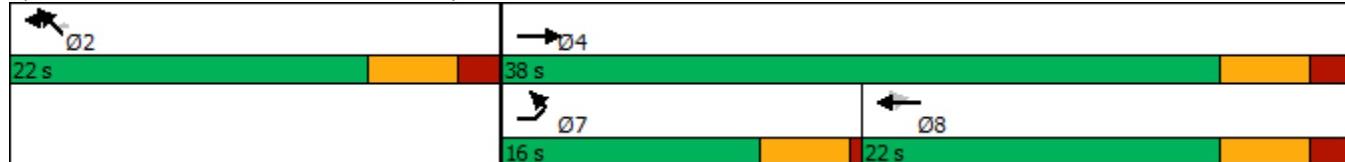
Intersection LOS: D

Intersection Capacity Utilization 62.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Route 2 WB Off Ramp & Lake Street



## Queues

2027 Build Weekday Evening Peak Hour

## 7: Route 2 WB Off Ramp &amp; Lake Street

01/14/2021



Lane Group	EBL	EBT	WBT	WBR	NWL	NWT	NWR
Lane Group Flow (vph)	418	932	293	387	120	122	28
v/c Ratio	1.19	0.94	0.64	0.59	0.27	0.26	0.05
Control Delay	137.1	33.8	26.9	6.5	19.4	19.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	137.1	33.8	26.9	6.5	19.4	19.3	0.1
Queue Length 50th (ft)	~191	283	93	0	35	36	0
Queue Length 95th (ft)	#331	#514	163	57	75	76	0
Internal Link Dist (ft)			425	300		449	
Turn Bay Length (ft)	250			75	100		
Base Capacity (vph)	352	1022	489	678	445	462	595
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.19	0.91	0.60	0.57	0.27	0.26	0.05

## Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
Lane Configurations			↑↑			↑↑		
Traffic Volume (vph)	0	0	2211	0	0	1131		
Future Volume (vph)	0	0	2211	0	0	1131		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.88		
Frt						0.850		
Flt Protected								
Satd. Flow (prot)	0	0	4776	0	0	2617		
Flt Permitted								
Satd. Flow (perm)	0	0	4776	0	0	2617		
Right Turn on Red				Yes		Yes		
Satd. Flow (RTOR)						1		
Link Speed (mph)		30	30		30			
Link Distance (ft)		201	192		296			
Travel Time (s)		4.6	4.4		6.7			
Peak Hour Factor	0.92	0.92	0.97	0.97	0.98	0.98		
Heavy Vehicles (%)	2%	2%	1%	0%	0%	1%		
Adj. Flow (vph)	0	0	2279	0	0	1154		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	2279	0	0	1154		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Left	Left	Right	Left	Right		
Median Width(ft)		0	0		0			
Link Offset(ft)		0	0		0			
Crosswalk Width(ft)		16	16		16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	15			9	15	30		
Number of Detectors			2			1		
Detector Template			Thru		Right			
Leading Detector (ft)			100		20			
Trailing Detector (ft)			0		0			
Detector 1 Position(ft)			0		0			
Detector 1 Size(ft)			6		20			
Detector 1 Type			Cl+Ex		Cl+Ex			
Detector 1 Channel								
Detector 1 Extend (s)			0.0		0.0			
Detector 1 Queue (s)			0.0		0.0			
Detector 1 Delay (s)			0.0		0.0			
Detector 2 Position(ft)			94					
Detector 2 Size(ft)			6					
Detector 2 Type			Cl+Ex					
Detector 2 Channel								
Detector 2 Extend (s)			0.0					
Turn Type			NA		custom			
Protected Phases			2		3 4	3	4	
Permitted Phases								
Detector Phase			2		3 4			



Lane Group	EBL	EBT	WBT	WBR	SWL	SWR	Ø3	Ø4
<b>Switch Phase</b>								
Minimum Initial (s)								
							10.0	10.0
Minimum Split (s)							15.0	15.0
Total Split (s)							58.0	36.0
Total Split (%)							48.3%	30% 22%
Maximum Green (s)							53.0	30.0 21.0
Yellow Time (s)							4.0	4.0 3.5
All-Red Time (s)							1.0	2.0 1.5
Lost Time Adjust (s)							0.0	
Total Lost Time (s)							5.0	
<b>Lead/Lag</b>							Lead	Lag
Lead-Lag Optimize?								
Vehicle Extension (s)							3.0	3.0
Recall Mode							C-Max	Max Max
Walk Time (s)								5.0
Flash Dont Walk (s)								8.0
Pedestrian Calls (#/hr)								0
Act Effect Green (s)							53.0	56.0
Actuated g/C Ratio							0.44	0.47
v/c Ratio							1.08	0.95
Control Delay							47.1	46.7
Queue Delay							1.5	0.0
Total Delay							48.7	46.7
LOS							D	D
Approach Delay							48.7	46.7
Approach LOS							D	D

**Intersection Summary**

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 48.0

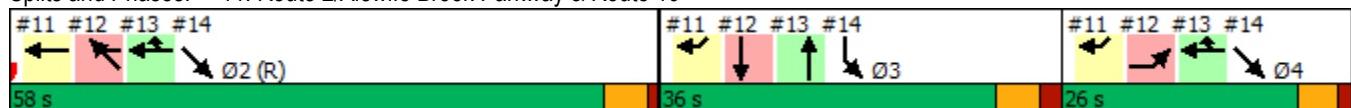
Intersection LOS: D

Intersection Capacity Utilization 100.6%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 11: Route 2/Alewife Brook Parkway &amp; Route 16





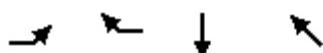
Lane Group	WBT	SWR
Lane Group Flow (vph)	2279	1154
v/c Ratio	1.08	0.95
Control Delay	47.1	46.7
Queue Delay	1.5	0.0
Total Delay	48.7	46.7
Queue Length 50th (ft)	~704	472
Queue Length 95th (ft)	m#56	#644
Internal Link Dist (ft)	112	
Turn Bay Length (ft)		
Base Capacity (vph)	2109	1221
Starvation Cap Reductn	7	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.08	0.95

**Intersection Summary**

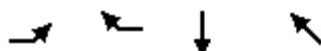
- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Lanes, Volumes, Timings  
12: Alewife Brook Parkway & Route 2

2027 Build Weekday Evening Peak Hour  
01/14/2021



Lane Group	EBL	WBR	SBT	NWT
Lane Configurations	↑↑	↑	↑↑	↑↑
Traffic Volume (vph)	610	591	250	1620
Future Volume (vph)	610	591	250	1620
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	13	16	13	13
Lane Util. Factor	0.97	1.00	0.95	0.95
Frt	0.865			
Flt Protected	0.950			
Satd. Flow (prot)	3257	1660	3291	3324
Flt Permitted	0.950			
Satd. Flow (perm)	3257	1660	3291	3324
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)		30	30	
Link Distance (ft)		202	278	
Travel Time (s)		4.6	6.3	
Peak Hour Factor	0.90	0.95	0.98	0.97
Heavy Vehicles (%)	0%	1%	2%	1%
Adj. Flow (vph)	678	622	255	1670
Shared Lane Traffic (%)				
Lane Group Flow (vph)	678	622	255	1670
Enter Blocked Intersection	No	No	No	No
Lane Alignment	Left	R NA	Left	L NA
Median Width(ft)		0	0	
Link Offset(ft)		0	0	
Crosswalk Width(ft)		16	16	
Two way Left Turn Lane				
Headway Factor	1.10	0.97	1.10	1.10
Turning Speed (mph)	15	30		
Number of Detectors	1	1	2	2
Detector Template	Left	Right	Thru	Thru
Leading Detector (ft)	20	20	100	100
Trailing Detector (ft)	0	0	0	0
Detector 1 Position(ft)	0	0	0	0
Detector 1 Size(ft)	20	20	6	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel				
Detector 1 Extend (s)	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94	94	
Detector 2 Size(ft)		6	6	
Detector 2 Type		Cl+Ex	Cl+Ex	
Detector 2 Channel				
Detector 2 Extend (s)		0.0	0.0	
Turn Type	Prot	Prot	NA	NA
Protected Phases	4	2!	3	2!
Permitted Phases				
Detector Phase	4	2	3	2



Lane Group	EBL	WBR	SBT	NWT
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.0	15.0	19.0	15.0
Total Split (s)	26.0	58.0	36.0	58.0
Total Split (%)	21.7%	48.3%	30.0%	48.3%
Maximum Green (s)	21.0	53.0	30.0	53.0
Yellow Time (s)	3.5	4.0	4.0	4.0
All-Red Time (s)	1.5	1.0	2.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	6.0	5.0
Lead/Lag	Lag	Lead		
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	C-Max	Max	C-Max
Walk Time (s)			5.0	
Flash Dont Walk (s)			8.0	
Pedestrian Calls (#/hr)			0	
Act Effect Green (s)	21.0	53.0	30.0	53.0
Actuated g/C Ratio	0.18	0.44	0.25	0.44
v/c Ratio	1.19	0.85	0.31	1.14
Control Delay	145.7	29.8	37.8	103.1
Queue Delay	0.0	3.3	0.0	0.3
Total Delay	145.7	33.1	37.8	103.3
LOS	F	C	D	F
Approach Delay			37.8	103.3
Approach LOS			D	F

#### Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 93.5

Intersection LOS: F

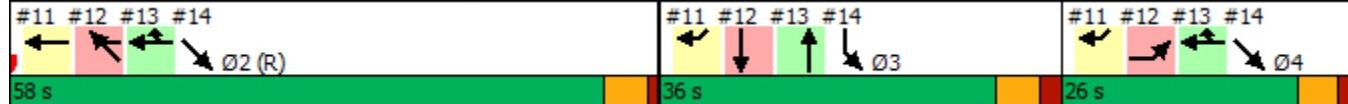
Intersection Capacity Utilization 134.8%

ICU Level of Service H

Analysis Period (min) 15

! Phase conflict between lane groups.

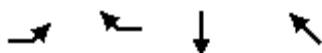
Splits and Phases: 12: Alewife Brook Parkway & Route 2



Queues  
12: Alewife Brook Parkway & Route 2

2027 Build Weekday Evening Peak Hour

01/14/2021



Lane Group	EBL	WBR	SBT	NWT
Lane Group Flow (vph)	678	622	255	1670
V/c Ratio	1.19	0.85	0.31	1.14
Control Delay	145.7	29.8	37.8	103.1
Queue Delay	0.0	3.3	0.0	0.3
Total Delay	145.7	33.1	37.8	103.3
Queue Length 50th (ft)	~326	422	84	~794
Queue Length 95th (ft)	#446	#639	123	#933
Internal Link Dist (ft)			122	198
Turn Bay Length (ft)				
Base Capacity (vph)	569	733	822	1468
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	53	0	107
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.19	0.91	0.31	1.23

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

## Lanes, Volumes, Timings

2027 Build Weekday Evening Peak Hour

13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	591	328	0	238	0	0	0	0
Future Volume (vph)	0	0	0	0	591	328	0	238	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0					200	0		0	0	0	0
Storage Lanes	0					1	0		0	0	0	0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr <sub>t</sub>							0.850					
Flt Protected												
Satd. Flow (prot)	0	0	0	0	1693	1439	0	3217	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	1693	1439	0	3217	0	0	0	0
Right Turn on Red				No		No	No		No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		161			1225			227			185	
Travel Time (s)		3.7			27.8			5.2			4.2	
Confl. Peds. (#/hr)						2						
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.97	0.97	0.97	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	1%	1%	0%	1%	0%	2%	2%	2%
Adj. Flow (vph)	0	0	0	0	622	345	0	245	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	622	345	0	245	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	0				0			0			0	
Link Offset(ft)	0				0			0			0	
Crosswalk Width(ft)	16				16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors					2	1		2				
Detector Template						Thru	Right		Thru			
Leading Detector (ft)					100	20		100				
Trailing Detector (ft)					0	0		0				
Detector 1 Position(ft)					0	0		0				
Detector 1 Size(ft)					6	20		6				
Detector 1 Type					Cl+Ex	Cl+Ex		Cl+Ex				
Detector 1 Channel												
Detector 1 Extend (s)					0.0	0.0		0.0				
Detector 1 Queue (s)					0.0	0.0		0.0				
Detector 1 Delay (s)					0.0	0.0		0.0				
Detector 2 Position(ft)					94			94				
Detector 2 Size(ft)					6			6				
Detector 2 Type					Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				

Lane Group	Ø2	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Fr <sub>t</sub>		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		

## Lanes, Volumes, Timings

13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access

2027 Build Weekday Evening Peak Hour

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type					NA	Prot		NA				
Protected Phases					24	24			3			
Permitted Phases												
Detector Phase					24	24			3			
Switch Phase												
Minimum Initial (s)								10.0				
Minimum Split (s)								19.0				
Total Split (s)								36.0				
Total Split (%)								30.0%				
Maximum Green (s)								30.0				
Yellow Time (s)								4.0				
All-Red Time (s)								2.0				
Lost Time Adjust (s)								0.0				
Total Lost Time (s)								6.0				
Lead/Lag								Lead				
Lead-Lag Optimize?												
Vehicle Extension (s)								3.0				
Recall Mode								Max				
Walk Time (s)								5.0				
Flash Dont Walk (s)								8.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)				79.0	79.0			30.0				
Actuated g/C Ratio				0.66	0.66			0.25				
v/c Ratio				0.56	0.36			0.30				
Control Delay				13.5	10.5			37.8				
Queue Delay				2.1	0.0			0.0				
Total Delay				15.6	10.5			37.8				
LOS				B	B			D				
Approach Delay				13.8				37.8				
Approach LOS				B				D				

## Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 18.6

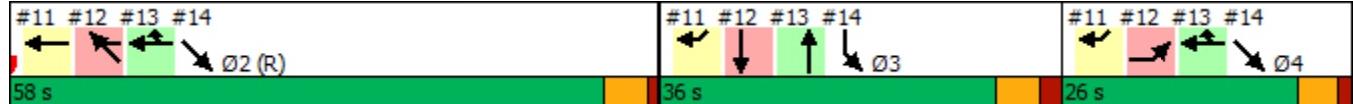
Intersection LOS: B

Intersection Capacity Utilization 52.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access



Lane Group	Ø2	Ø4
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	15.0	15.0
Total Split (s)	58.0	26.0
Total Split (%)	48%	22%
Maximum Green (s)	53.0	21.0
Yellow Time (s)	4.0	3.5
All-Red Time (s)	1.0	1.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	C-Max	Max
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

## Queues

2027 Build Weekday Evening Peak Hour

13: Alewife Brook Parkway &amp; Route 2/Rt 2 WB Access

01/14/2021



Lane Group	WBT	WBR	NBT
Lane Group Flow (vph)	622	345	245
v/c Ratio	0.56	0.36	0.30
Control Delay	13.5	10.5	37.8
Queue Delay	2.1	0.0	0.0
Total Delay	15.6	10.5	37.8
Queue Length 50th (ft)	239	110	81
Queue Length 95th (ft)	337	165	119
Internal Link Dist (ft)	1145		147
Turn Bay Length (ft)		200	
Base Capacity (vph)	1114	947	804
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	337	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.80	0.36	0.30

Intersection Summary

Lanes, Volumes, Timings  
14: Alewife Brook Parkway & Route 2

2027 Build Weekday Evening Peak Hour

01/14/2021



Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Lane Configurations	↑↑			↑↑				
Traffic Volume (vph)	250	0	0	988	0	0		
Future Volume (vph)	250	0	0	988	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	13	13	13	13	13	13		
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	1.00		
Frt								
Flt Protected	0.950							
Satd. Flow (prot)	3193	0	0	3324	0	0		
Flt Permitted	0.950							
Satd. Flow (perm)	3193	0	0	3324	0	0		
Right Turn on Red	Yes	Yes				Yes		
Satd. Flow (RTOR)	234							
Link Speed (mph)	30			30	30			
Link Distance (ft)	155			297	139			
Travel Time (s)	3.5			6.8	3.2			
Peak Hour Factor	0.98	0.98	0.90	0.90	0.92	0.92		
Heavy Vehicles (%)	2%	0%	0%	1%	2%	2%		
Adj. Flow (vph)	255	0	0	1098	0	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	255	0	0	1098	0	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Right	Left	Left	Left	Right		
Median Width(ft)	26			0	0			
Link Offset(ft)	0			0	0			
Crosswalk Width(ft)	16			16	16			
Two way Left Turn Lane								
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10		
Turning Speed (mph)	30	9	15			9		
Number of Detectors	1			2				
Detector Template	Left			Thru				
Leading Detector (ft)	20			100				
Trailing Detector (ft)	0			0				
Detector 1 Position(ft)	0			0				
Detector 1 Size(ft)	20			6				
Detector 1 Type	Cl+Ex			Cl+Ex				
Detector 1 Channel								
Detector 1 Extend (s)	0.0			0.0				
Detector 1 Queue (s)	0.0			0.0				
Detector 1 Delay (s)	0.0			0.0				
Detector 2 Position(ft)				94				
Detector 2 Size(ft)				6				
Detector 2 Type				Cl+Ex				
Detector 2 Channel								
Detector 2 Extend (s)				0.0				
Turn Type	Prot			NA				
Protected Phases	3			2 4			2	4
Permitted Phases								
Detector Phase	3			2 4				



Lane Group	SBL	SBR	SEL	SET	NWT	NWR	Ø2	Ø4
Switch Phase								
Minimum Initial (s)	10.0						10.0	10.0
Minimum Split (s)	19.0						15.0	15.0
Total Split (s)	36.0						58.0	26.0
Total Split (%)	30.0%						48%	22%
Maximum Green (s)	30.0						53.0	21.0
Yellow Time (s)	4.0						4.0	3.5
All-Red Time (s)	2.0						1.0	1.5
Lost Time Adjust (s)	0.0							
Total Lost Time (s)	6.0							
Lead/Lag	Lead						Lag	
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0						3.0	3.0
Recall Mode	Max						C-Max	Max
Walk Time (s)	5.0							
Flash Dont Walk (s)	8.0							
Pedestrian Calls (#/hr)	0							
Act Effect Green (s)	30.0				79.0			
Actuated g/C Ratio	0.25				0.66			
v/c Ratio	0.26				0.50			
Control Delay	0.8				11.4			
Queue Delay	0.5				0.0			
Total Delay	1.3				11.4			
LOS	A				B			
Approach Delay	1.3				11.4			
Approach LOS	A				B			

#### Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBT, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 9.5

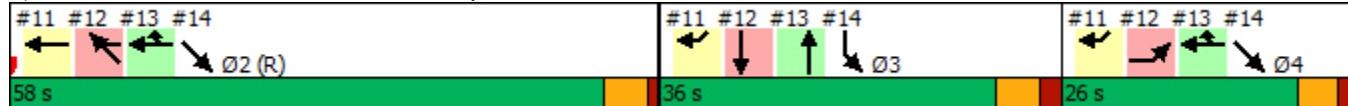
Intersection LOS: A

Intersection Capacity Utilization 47.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 14: Alewife Brook Parkway & Route 2



Queues  
14: Alewife Brook Parkway & Route 2

2027 Build Weekday Evening Peak Hour

01/14/2021



Lane Group	SBL	SET
Lane Group Flow (vph)	255	1098
v/c Ratio	0.26	0.50
Control Delay	0.8	11.4
Queue Delay	0.5	0.0
Total Delay	1.3	11.4
Queue Length 50th (ft)	0	210
Queue Length 95th (ft)	1	258
Internal Link Dist (ft)	75	217
Turn Bay Length (ft)		
Base Capacity (vph)	973	2188
Starvation Cap Reductn	391	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.44	0.50
Intersection Summary		

## Lanes, Volumes, Timings

## 36: Minuteman Commuter Bikeway &amp; Lake Street

2027 Build Weekday Evening Peak Hour

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	857	0	0	660	0	0	0	0	0	0	0
Future Volume (vph)	0	857	0	0	660	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	16	16	16	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	2049	0	0	2153	0	0	0	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	2049	0	0	2153	0	0	0	0	0	0	0
Right Turn on Red				Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		135			215			175			206	
Travel Time (s)		3.1			4.9			4.0			4.7	
Peak Hour Factor	0.84	0.84	0.84	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	1020	0	0	680	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1020	0	0	680	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.88	0.88	0.88	0.85	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2			2							
Detector Template		Thru			Thru							
Leading Detector (ft)		100			100							
Trailing Detector (ft)		0			0							
Detector 1 Position(ft)		0			0							
Detector 1 Size(ft)		6			6							
Detector 1 Type		Cl+Ex			Cl+Ex							
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0							
Detector 1 Queue (s)		0.0			0.0							
Detector 1 Delay (s)		0.0			0.0							
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA			NA							
Protected Phases		2			6							
Permitted Phases												
Detector Phase		2			6							

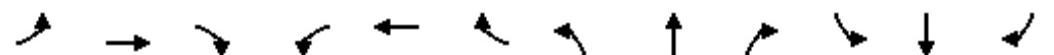
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

## Lanes, Volumes, Timings

36: Minuteman Commuter Bikeway &amp; Lake Street

2027 Build Weekday Evening Peak Hour

01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
<b>Switch Phase</b>												
Minimum Initial (s)		4.0			4.0							
Minimum Split (s)		20.5			20.5							
Total Split (s)		47.0			47.0							
Total Split (%)		67.1%			67.1%							
Maximum Green (s)		42.5			42.5							
Yellow Time (s)		3.5			3.5							
All-Red Time (s)		1.0			1.0							
Lost Time Adjust (s)		0.0			0.0							
Total Lost Time (s)		4.5			4.5							
<b>Lead/Lag</b>												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0							
Recall Mode		C-Max			C-Max							
Walk Time (s)												
Flash Dont Walk (s)												
<b>Pedestrian Calls (#/hr)</b>												
Act Effect Green (s)		47.5			47.5							
Actuated g/C Ratio		0.68			0.68							
v/c Ratio		0.73			0.47							
Control Delay		11.3			6.9							
Queue Delay		50.6			1.8							
Total Delay		61.8			8.6							
LOS		E			A							
Approach Delay		61.8			8.6							
Approach LOS		E			A							

**Intersection Summary**

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 40.6

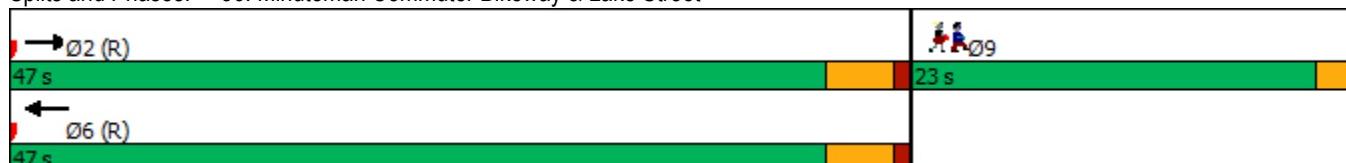
Intersection LOS: D

Intersection Capacity Utilization 48.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 36: Minuteman Commuter Bikeway &amp; Lake Street



Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	18.0
Total Split (s)	23.0
Total Split (%)	33%
Maximum Green (s)	21.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	220
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	



Lane Group	EBT	WBT
Lane Group Flow (vph)	1020	680
v/c Ratio	0.73	0.47
Control Delay	11.3	6.9
Queue Delay	50.6	1.8
Total Delay	61.8	8.6
Queue Length 50th (ft)	233	230
Queue Length 95th (ft)	316	168
Internal Link Dist (ft)	55	135
Turn Bay Length (ft)		
Base Capacity (vph)	1390	1460
Starvation Cap Reductn	0	585
Spillback Cap Reductn	609	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.31	0.78

Intersection Summary

Lanes, Volumes, Timings  
39: Brooks Avenue & Lake Street

2027 Build Weekday Evening Peak Hour

01/14/2021

	→	→	→	←	←	↑	↑	↑	↓	↓	←	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	705	70	6	537	1	15	5	7	0	5	108
Future Volume (vph)	82	705	70	6	537	1	15	5	7	0	5	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	13	13	13	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989						0.966			0.871	
Flt Protected		0.995			0.999			0.973				
Satd. Flow (prot)	0	1994	0	0	1961	0	0	1786	0	0	1655	0
Flt Permitted		0.893			0.991			0.635				
Satd. Flow (perm)	0	1790	0	0	1946	0	0	1165	0	0	1655	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		8					9			140		
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		215			1126			206			208	
Travel Time (s)		4.9			25.6			4.7			4.7	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.75	0.75	0.75	0.77	0.77	0.77
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	93	801	80	7	610	1	20	7	9	0	6	140
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	974	0	0	618	0	0	36	0	0	146	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.92	0.92	0.92	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru										
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex										
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	

Lanes, Volumes, Timings  
39: Brooks Avenue & Lake Street

2027 Build Weekday Evening Peak Hour  
01/14/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.5	20.5		20.5	20.5		14.0	14.0		14.0	14.0	
Total Split (s)	36.0	36.0		36.0	36.0		14.0	14.0		14.0	14.0	
Total Split (%)	51.4%	51.4%		51.4%	51.4%		20.0%	20.0%		20.0%	20.0%	
Maximum Green (s)	31.5	31.5		31.5	31.5		9.5	9.5		9.5	9.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0			0.0			0.0			0.0		
Total Lost Time (s)	4.5			4.5			4.5			4.5		
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		Min	Min		Min	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effect Green (s)	43.2			43.2			7.0			7.0		
Actuated g/C Ratio	0.62			0.62			0.10			0.10		
v/c Ratio	0.88			0.52			0.29			0.50		
Control Delay	26.9			12.3			29.2			12.8		
Queue Delay	47.7			0.6			0.0			0.2		
Total Delay	74.6			12.9			29.2			13.0		
LOS	E			B			C			B		
Approach Delay	74.6			12.9			29.2			13.0		
Approach LOS	E			B			C			B		

#### Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 47.1

Intersection LOS: D

Intersection Capacity Utilization 94.0%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 39: Brooks Avenue & Lake Street

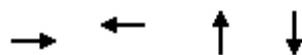


Lane Group	Ø9
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	18.0
Total Split (s)	20.0
Total Split (%)	29%
Maximum Green (s)	18.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	42
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Queues  
39: Brooks Avenue & Lake Street

2027 Build Weekday Evening Peak Hour

01/14/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	974	618	36	146
v/c Ratio	0.88	0.52	0.29	0.50
Control Delay	26.9	12.3	29.2	12.8
Queue Delay	47.7	0.6	0.0	0.2
Total Delay	74.6	12.9	29.2	13.0
Queue Length 50th (ft)	~281	174	11	2
Queue Length 95th (ft)	#678	289	29	33
Internal Link Dist (ft)	135	1046	126	128
Turn Bay Length (ft)				
Base Capacity (vph)	1107	1200	165	345
Starvation Cap Reductn	247	0	0	0
Spillback Cap Reductn	0	254	0	18
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.13	0.65	0.22	0.45

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.